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Plant Remains from the Smokemont Site in the Appalachian Mountains of North Carolina

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Plant Remains from the Smokemont Site in the Appalachian Mountains of North Carolina

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Dedication

To my wonderful grandmother, Lorene Vernard Bush.

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Abstract

Smokemont (31Sw393) is a multicomponent site consisting of deposits from Archaic, Woodland, Mississippian, Cherokee, and Euro-American occupations. Located in Swain County in the Smoky Mountains in western North Carolina, two structures have been identified at Smokemont, one as a Mississippian Pisgah phase house, and the other a Contact period Qualla phase house. Beneath the Pisgah house are several Connestee period pit features. Archaeobotanical remains have been collected from Woodland, Mississippian, and Cherokee contexts. Floral analysis of Middle Woodland features indicate some horticultural activity, with wild plants remaining important but supplementary to maize agriculture during the Mississippian and Cherokee occupations. This thesis provides an analysis of the plant remains found in Woodland, Mississippian, and Cherokee features. Archaeobotanical remains from the three components are compared to examine how site function and plant use change through time at this location. Finally, activities at Smokemont will be compared to other sites in the Appalachian Summit to determine if the settlements at Smokemont share trends in plant use found throughout the region.

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Introduction

Examining plant remains from archaeological sites can inform us about more than simply what people in the past were eating. In addition to providing a source of calories or nutrition, food is a part of people's *foodways*—the context of food production, storage, distribution, preparation, and presentation in a social and cultural setting (Johannessen 1993:182). Foodways shape, and are shaped by, the beliefs and practices within a society (Johannessen 1993:203-204). Therefore, studying foodways as seen in patterns in the archaeological record can help us better understand past cultures.

Plants have a number of different uses among Native Americans in Eastern North America. *Ethnobotany* broadly refers to the relationship between people and plants. In this thesis, I refer to the economic use of plants for foods, medicines, and material needs (Minnis 2003:3). It is through ethnohistoric documents and modern ethnographic research that we make sense of plant remains from archaeological sites, or *archaeobotanical* remains.

Paleoethnobotany is the investigation of subsistence patterns over time, the evolution and importance of domesticated crops, and the human impact on the plant environment (Ford 2003: xv). For example, during the Archaic and Woodland periods in Eastern North America, the occupants of the region intensely used nuts and edible seeds as a source of carbohydrates and plant oils. Eventually, they cultivated starchy and oily seeds, changing the morphological characteristics of the seeds themselves, making them more economically beneficial to the people planting them. Native Americans cleared lands for houses, gardens, and fields, encouraging weedy, fruit-producing, and nut-producing plants to grow near their settlements. Whether it was intentional or unintentional, people in the past shaped the environment through social and subsistence activities. As Mississippian peoples adopted corn agriculture around A.D. 1000, the use of native edible seeds declined in some regions, but nuts continued to be an important component of the diet. Paleoethnobotanical research helps archaeologists make sense of these changes and when they occurred.

In this thesis, I examine the archaeobotanical samples taken from Middle Woodland, Mississippian, and Contact period settlements at the Smokemont site (31Sw393) in Swain county in western North Carolina. My research is on the *macrobotanical* remains, or charred plant material, as opposed to *microbotanical* remains that include phytoliths and pollen. I examine how plant use changed through time at this site, and attempt to explain the social and cultural processes that led to the use of the plants represented in these flotation samples. In Chapter 1, I define the ecological and social settings of the Smokemont site. Then, I describe the features and structures from which these flotation samples were collected, and introduce relevant research conducted in the region. Chapter 2 begins with an overview of paleoethnobotanical methodology, followed by the methods used to collect and analyze the plant remains from Smokemont and the methods used at comparable sites. Then I describe the quantitative methods used by paleoethnobotanists, and discuss which are the most appropriate when analyzing the plant data from Smokemont. In Chapter 3, I analyze the samples from Smokemont, and compare the samples to one another when applicable. In Chapter 4, I compare my interpretations of the Smokemont data to other research that has been done on sites in the Appalachian Summit, and discuss ethnohistoric and ethnographic data on plant use in the region.

The Smokemont Site (31Sw393)

Smokemont lies located along U.S. Highway 441 in the Appalachian Mountains of Swain County, North Carolina. Smokemont is within the Smoky Mountains National Park in a flat, alluvial area next to the Oconaluftee River (Figure 1). The samples I use come from the 2009 and 2010 excavations conducted by the Archaeological Research Laboratory, University of Tennessee (ARL), led by Dr. Elizabeth DeCorse and Michael Angst, in collaboration with members of the Eastern Band of Cherokee Indians and the Great Smoky Mountains National Park. Archaeological materials from this site represent Middle Archaic, Early Woodland, Middle Woodland, Mississippian, Cherokee, and nineteenth- to twentieth-century Euro-American occupations (Angst 2013:5). Smokemont was first identified in 2006 during the installation of new water and sewer lines running to the Smokemont campground area (Angst 2013:13; Benyshek and Webb 2006). The ARL ran the Great Smoky Mountains Archaeological Field Program at Smokemont for four field seasons from 2007 through 2012 (DeCorse 2013:1). Four structures were identified at the site, as well as numerous features (Angst 2013:5). Two of the structures were Mississippian, and two were paired Cherokee houses. Flotation samples that were taken from one of the Mississippian structures (Structure 2), one of the Cherokee structures (Structure 1), and from two Middle Woodland period pits (beneath Structure 2) are the focus of this research (Figure 2).

Figure 1. Location of the Smokemont site on U.S. 441 (Angst 2013).

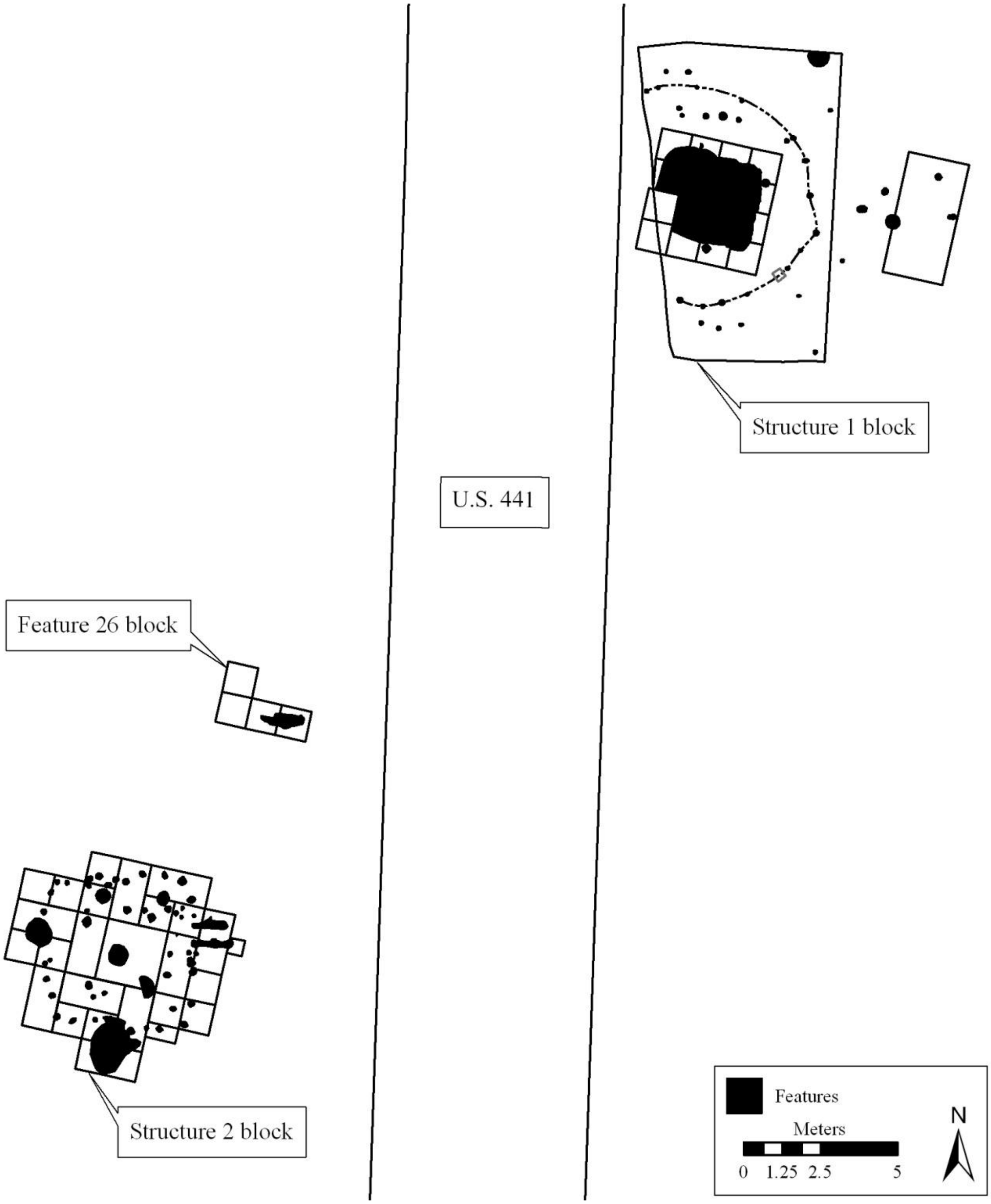

Figure 2. Location of Structures 1 and 2 along U.S. 441 (Angst 2013).

Chapter 1

Background

The Ecological Setting

Smokemont is located in the Blue Ridge province of the Appalachian Summit. The southern portion of the Blue Ridge Province is referred to as the Southern Blue Ridge (Figure 3; Dickens 1976:4). The Appalachian Summit is as wide as 113 kilometers, and has elevations above 1830 meters (Angst 2013:7). This region is made up of sprawling mountain ranges, including the Great Smokies, and contains many coves, basins, and narrow river valleys (Dickens 1976:4). Within this diverse terrain are a variety of contiguous microenvironments that vary in climate, soils, flora, and fauna (Dickens 1976:6). The Appalachian Summit is drained primarily by tributaries of the Tennessee River (Dickens 1976:4).

The Appalachian Mountains are abundant in natural resources. Smokemont is located within the Environmental Protection Agency Level IV Ecoregion in the Southern Metasedimentary Mountains, which is densely covered in Appalachian oak forests, and at higher elevations, northern hardwood forests that include a variety of oaks and pines, as well as silverbell, hemlock, yellow poplar, basswood, buckeye, yellow birch, and beech (Griffith *et al.* 2008). Chestnut trees were also common in this region before the chestnut blight in the early twentieth century. This region is home to a large variety of animals, including turkey, deer, eagle, and bear (Hudson 1976:20). Many tree species that produce nuts are indigenous to this area, including chestnut, hickory, black walnut, hazelnut, butternut, and several species of oak

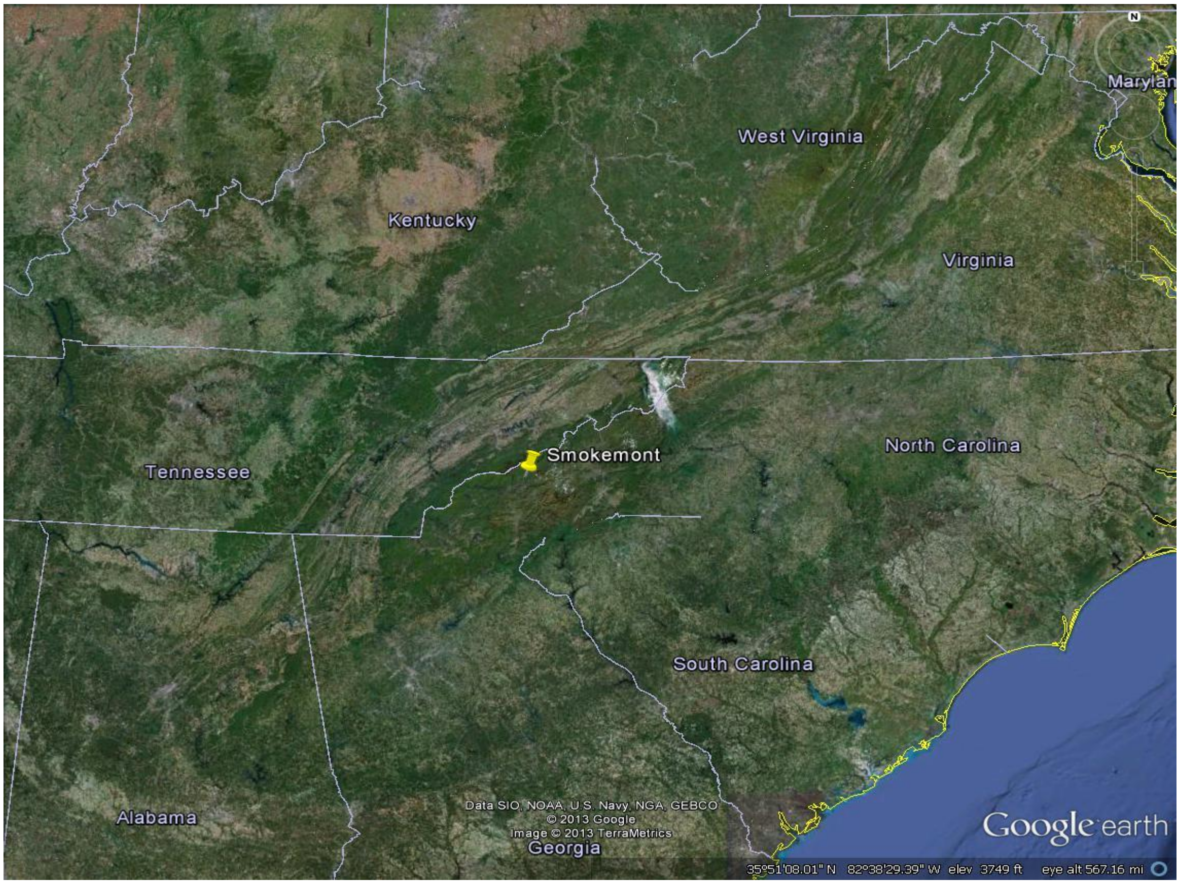

Figure 3. The location of Smokemont (31Sw393).

(Hudson 1976:20). Large poplar trees are common in the mountains, and their wood was particularly useful for making dugout canoes (Hudson 1976:20). Many types of minerals common in this region were used by Native Americans, including mica, steatite, and quartz crystals (Hudson 1976:20).

The Cultural Setting

The Smokemont site contains evidence of a long history of occupation, with artifacts from the Middle Archaic through Euro-American periods. The archaeological record indicates the periods of the most intense occupation at Smokemont were during the Middle Woodland (Connestee phase), Mississippian (Pisgah phase), and Contact period (Late Qualla phase). The Smokemont site is representative of a larger culture area in the Appalachian Summit. The settlements in this region have been divided geographically, ethnohistorically, and archaeologically, and many of these divisions overlap spatially and temporally.

The Appalachian Highlands is a physiographic division designated by N.M. Fenneman in 1928 (Kroeber 1939:182). Alfred Kroeber (1939:183) described this region as the Appalachian Summit. Kroeber stated that the Appalachian Summit was the most complex physiographic division, with no less than seven provinces and 22 sections. Four of these provinces are culturally significant areas in the Southeast, and include the Piedmont province, the Blue Ridge province, the Valley and Ridge province, and the Appalachian Plateaus province (Kroeber 1939:184). Kroeber (1939:95) viewed the Appalachian system as the backbone of Cherokee territory, but he found the Cherokees difficult to place in only one of the physiographic areas designated (Figure 4).

Ethnohistorically, the Cherokees were divided into towns (Figure 5). Maps from the eighteenth century show dozens of Cherokee towns in North and South Carolina, Tennessee, and Georgia (Rodning 2004:13). Valley, Out, and Middle towns were located in the Appalachian Summit, at the heart of Cherokee country (Rodning 2004:13; Schroedl 1986:7). Overhill towns were located in the lower Little Tennessee Valley in the Ridge and Valley province of eastern Tennessee, representing northern Cherokee country (Schroedl 1986:7). Lower towns were located between the Blue Ridge and Piedmont provinces of northwestern Georgia and northwestern South Carolina (Hally 1986; Rodning 2004:17). Lower, Middle, Valley, and Overhill towns differed politically, socially, economically, and linguistically within Cherokee territory (Schroedl 1986:5). Several trails crisscrossed the Appalachian Summit, allowing for travel from town to town (Myer 1928; Rodning 2004:22). Besides towns and villages, hamlets and farmsteads were scattered between major concentrations of settlements (Rodning 2004:33). People in villages or farmsteads between Cherokee towns maintained social affiliations with one or more nearby settlements with townhouses (Rodning 2004:48). European traders did not establish trade relationships with Cherokees in the Appalachian Summit and Ridge and Valley province until the late seventeenth- to early eighteenth century (Rodning 2004:43; Schroedl 1986:7). European trade goods reached Smokemont and other settlements before then through native exchange networks (Gremillion 1993; Waselkov 1989).

Archaeological phases are largely determined by ceramic and lithic typologies and structures. Late Middle Woodland period ceramics at Smokemont, Ravensford, Biltmore, Garden Creek, Greene County, and Icehouse Bottom share a local tradition based on the ceramic series defined by Keel (1976) as the Connestee phase (A.D. 200 – 800) (Figure 6). Icehouse Bottom also shares a Middle Woodland ceramic typology dominant in the Ridge and Valley province that Lewis and Kneberg (1941) defined as Candy Creek.

In the Mississippian period, archaeological sites that share a ceramic typology and architectural style in the Blue Ridge Mountains such as Smokemont, Ravensford, and Warren Wilson were defined by Dickens (1976) as Pisgah phase (A.D. 1000-1450) (Figure 7). Pisgah peoples built square houses with distinctive parallel entry trenches. In the Ridge and Valley province, researchers with the Tellico Reservoir Project divided the Mississippian period into four time periods (Mississippian I, II, III, IV). Along the Little Tennessee River, the Mississippian period phases contemporary with the Pisgah phase was early Mississippian period Martin/Hiwassee Island phase (A.D. 900- A.D. 1300) (Chapman and Shea 1981).

In the Historic period (A.D. 1000-1450), the Cherokees are divided archaeologically into the Overhill settlements and the Qualla phase (Figure 8). The Overhill Cherokee roughly encompass the Overhill towns described in ethnohistoric documents. Qualla includes historically documented Valley, Middle, and Out Towns. At the Townsend Site, there appear to be four or five Historic period structures that could either be Overhill or Qualla (see Marcoux 2010).

Woodland period

The Woodland period in the Appalachian Summit lasted from around 1000 B.C. to A.D. 1600, and is divided into the Early (1000 – 300 B.C.), Middle (300 B.C. – A.D. 800), and Late Woodland (A.D. 800 – 1100) subperiods (Ward and Davis 1999:140-157). During the Woodland period in the eastern US, societies became increasingly complex, developing more elaborate mortuary rituals and participating in long-distance trade and exchange networks (Ward and Davis 1999:3). At this point in time, pottery-making reflected a great range of vessel forms,

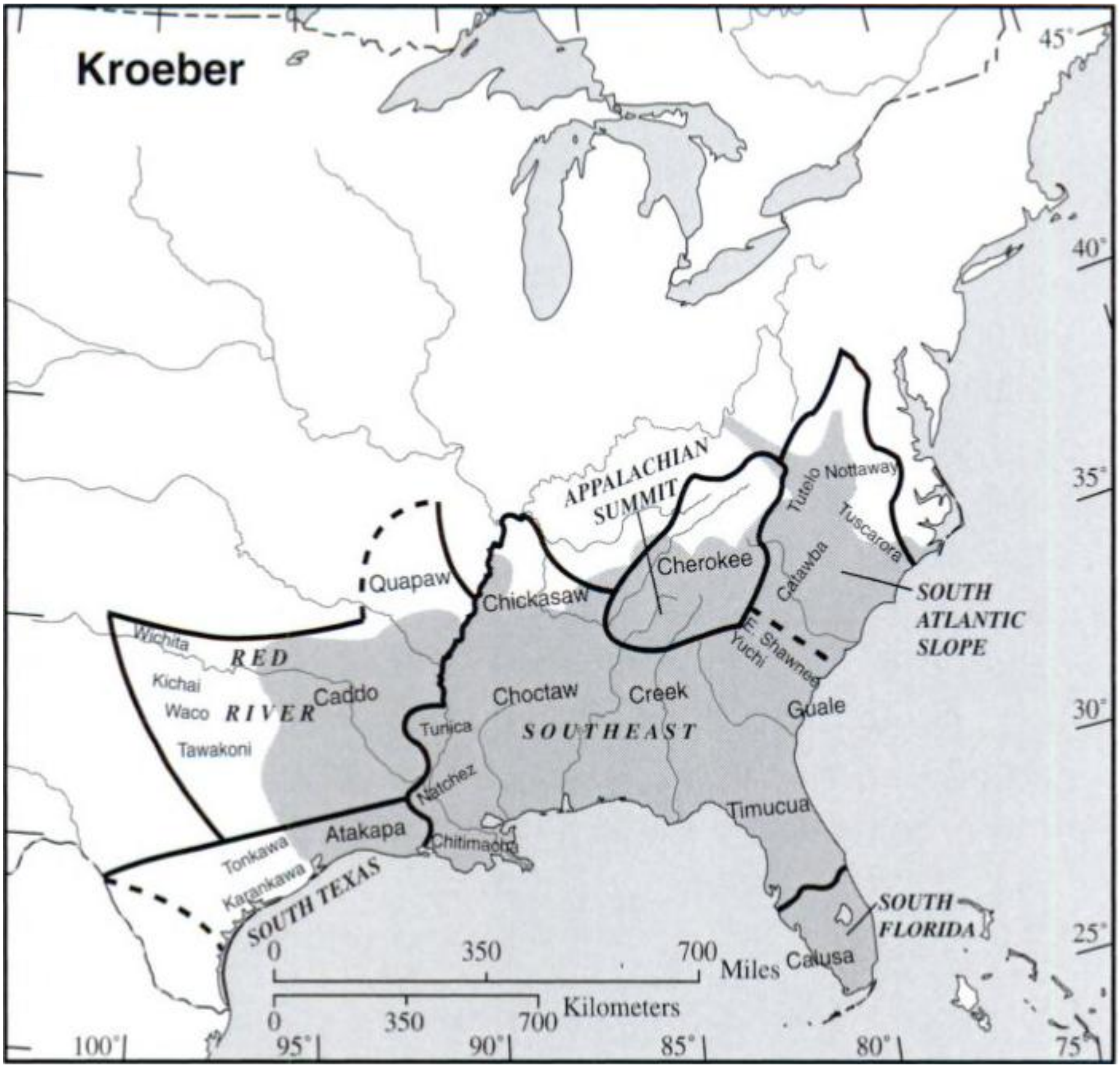

Figure 4. Culture Areas of the Southeast as defined by Kroeber 1939 (Jackson and Fogelson 2004:14:6).

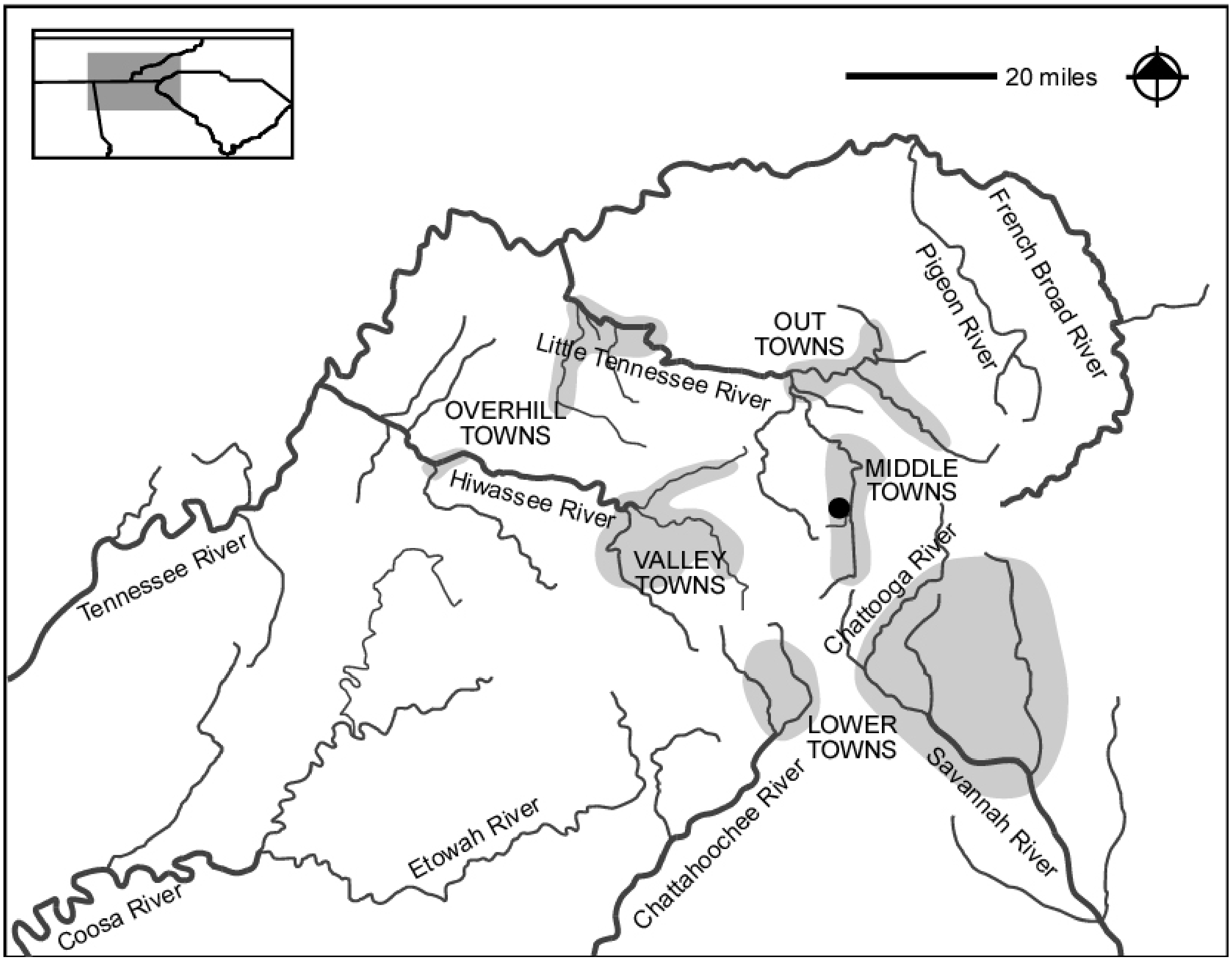

Figure 5. Location of Historic Cherokee towns in southern Appalachia (Rodning 2004:3).

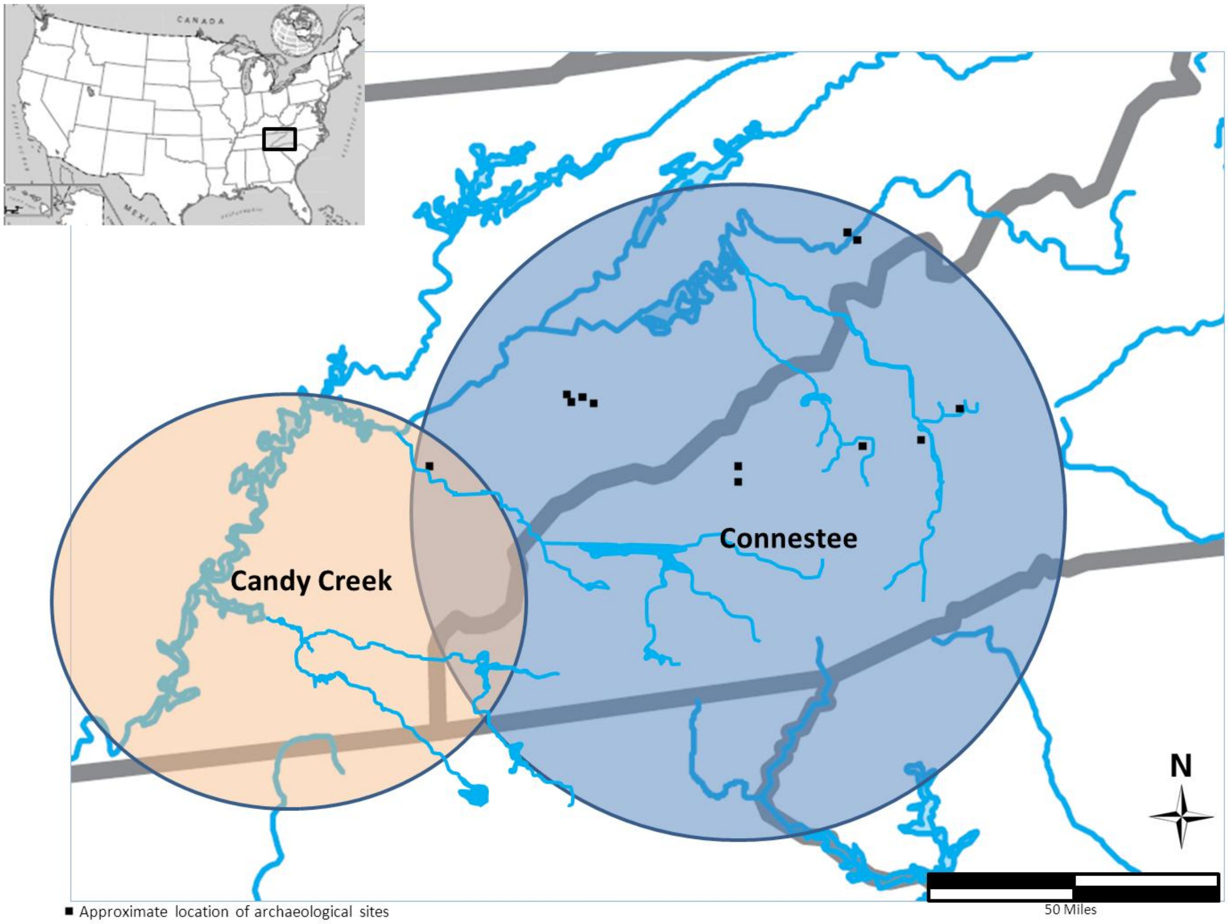

Figure 6. Middle Woodland period Archaeological phases in the Appalachian Summit.

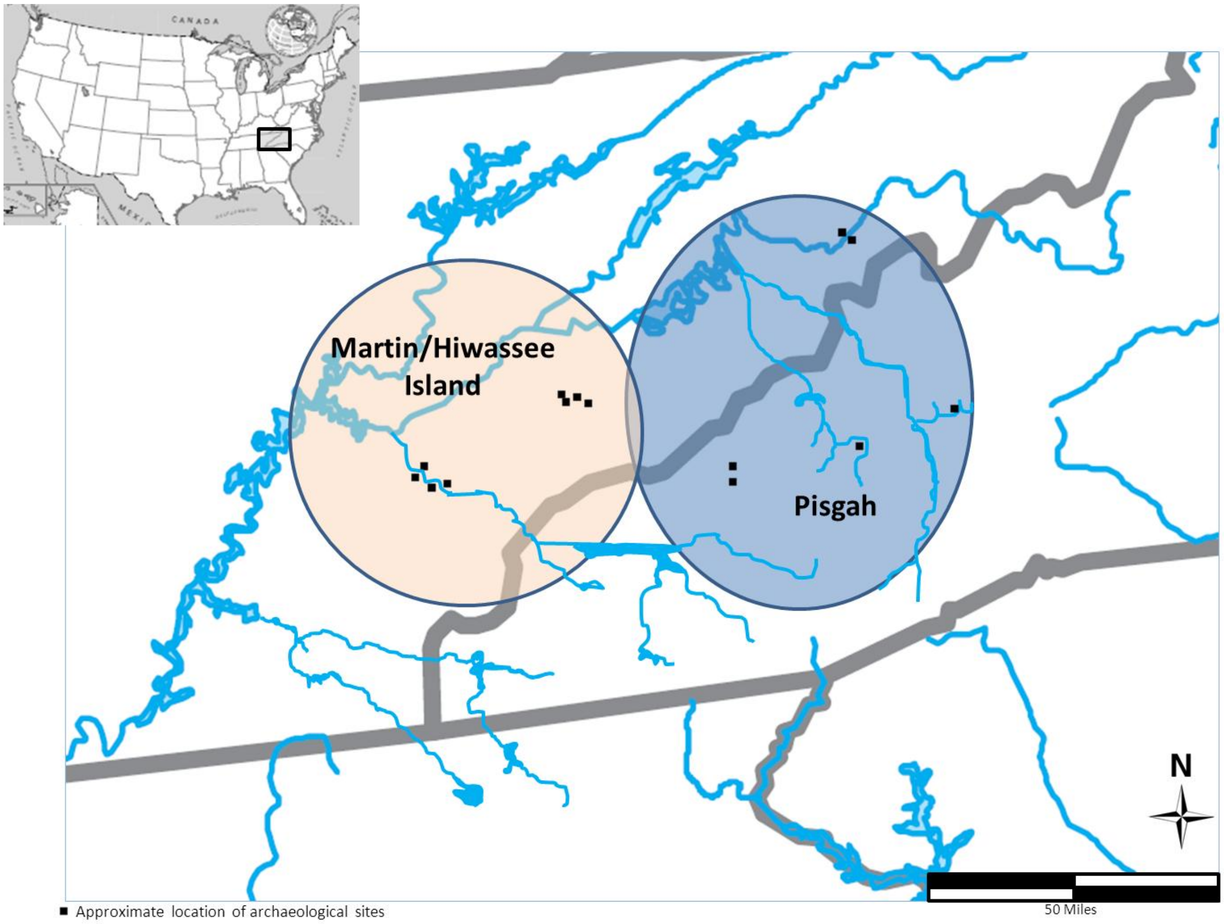

Figure 7. Mississippian period Archaeological phases in the Appalachian Summit.

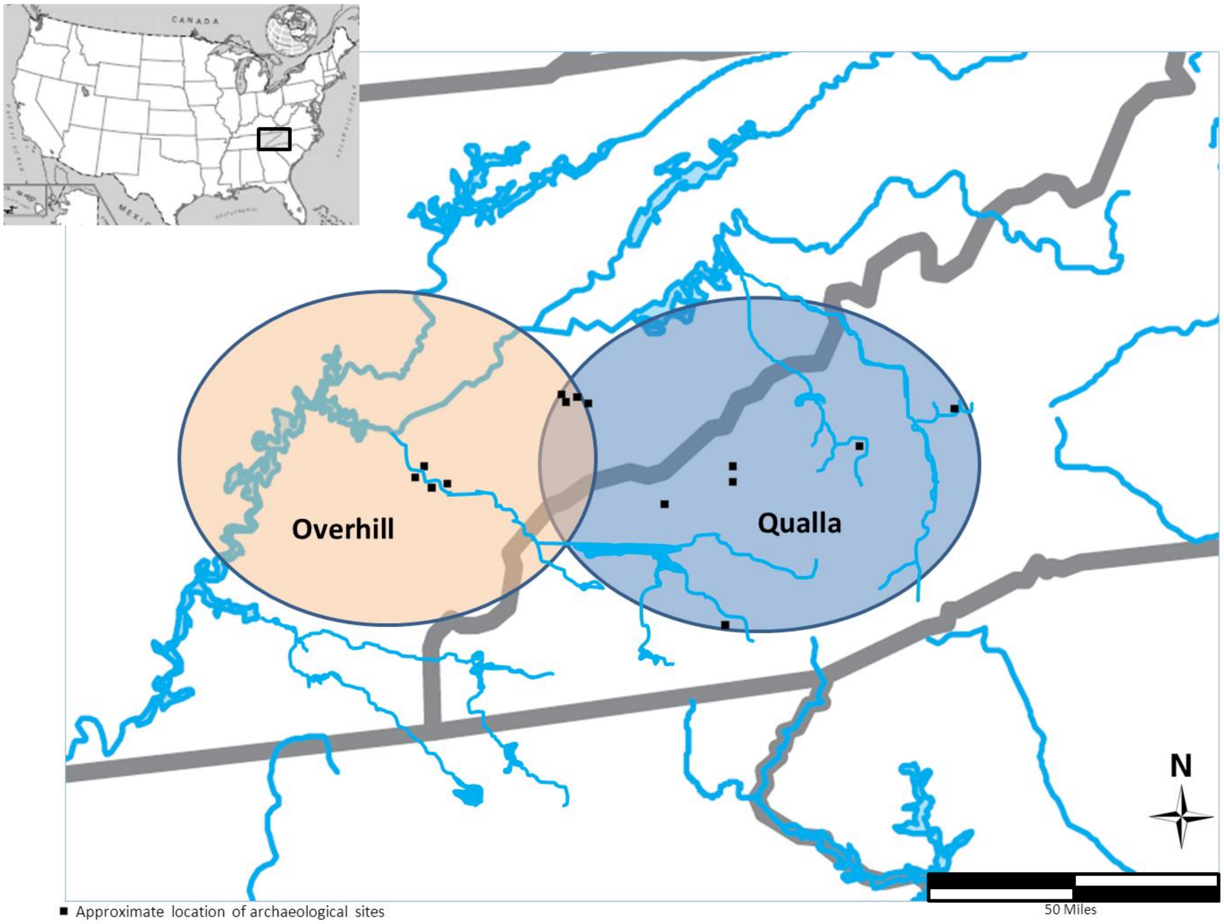

Figure 8. Historic period Archaeological phases in the Appalachian Summit.

functions, surface treatments, and decorations (Ward and Davis 1999:3). Although there was a gradual shift to agricultural economies, leading to larger and more permanent settlements, hunting and gathering remained important (Ward and Davis 1999:3).

The Middle Woodland period on the Appalachian Summit is further divided into two distinct phases of occupation in the North Carolina Mountains: the Pigeon phase (300 B.C. – A.D. 200) and the Connestee phase (A.D. 200 – 800) (Ward and Davis 1999:146). The Woodland period samples that are the focus of this thesis are from the Connestee phase. More is known about the Connestee phase than the Pigeon phase, and Connestee sites were larger and more intensely occupied (Ward and Davis 1999:154). Evidence suggests that the Connestee phase was culturally influenced by both the Hopewell centers to the north, and the Swift Creek area of southern and central Georgia. It is still unclear exactly when the Connestee phase ended (Ward and Davis 1999:155).

The Connestee phase is also present in the Tennessee Ridge and Valley Province. The Icehouse Bottom site (40Mr23) was a particularly important Connestee phase site in this region (Chapman and Keel 1979:158-159). Archaeological research of the Woodland period in the Ridge and Valley physiographic province has indicated that there was generally cultural continuity within the Tennessee Valley (Schroedl *et al*. 2007:176-177). The Middle Woodland period in this region is represented by the Candy Creek complex, which was not as strongly influenced by the Hopewell complex as the Connestee phase (Chapman and Keel 1979:159).

During the Connestee phase the importance of small-grained seed plants increased but corn agriculture had not yet been adopted (Ward and Davis 1999:154). Chenopod, sunflower, little barley, maygrass, knotweed, and cattail are some of the small seeds often identified at

Connestee phase sites (Wetmore 2002:265). Squash was perhaps cultivated in the eastern United States as early as 3490±40 radiocarbon years B.P. (Smith 2011). Fleshy fruits such as grape, cherry, blackberry, blueberry, and hackberry, and nuts such as acorn, hickory, walnuts, and chestnuts were important food sources during this period (Wetmore 2002:265). Although charred hickory nutshell generally preserves better than other nutshells in the archaeological record, at the Harshaw Bottom site (31Ce41) in Cherokee County, archaeobotanical evidence suggests that acorn was possibly an even more important food than hickory in this region (Gremillion 1989; Wetmore 2002:265).

Mississippian period

In the Appalachian Summit, the Mississippian tradition is represented by the Pisgah phase (A.D. 1000-1450). Pisgah sites tend to be found in floodplain environments, and are located in the eastern and central portions of the Appalachian Summit. Pisgah settlements vary in size, ranging from small farmsteads to fairly large nucleated villages with mounds. Smaller Pisgah sites tend to be clustered around larger villages with mounds (Ward and Davis 1999:159-160). No Pisgah phase mounds are located at Smokemont, and so far only two Pisgah phase houses have been uncovered.

In eastern Tennessee, Early Mississippian period Martin/Hiwassee Island phase (A.D. 900- A.D. 1300) (Davis 1990:61). Archaeological investigations have been limited in the northern part of the Tennessee Valley (with Knoxville representing the approximate boundary of different cultural, physiographic, and environmental areas). Available data suggest that the occupants in this part of the upper Tennessee Valley shared a strong cultural affinity with western North Carolina during the Mississippian period (Boyd 1985; Schroedl *et al.* 2007:176-177).

Pisgah phase houses were rectangular structures with parallel entry trenches. Pisgah houses probably had walls made of cane wattle sealed with clay, at least during the winter months (Ward and Davis 1999:162-163). Wall coverings, such as split-cane mats or bark, may have been used to cover daub walls. Bark or possibly straw thatch was used as roof coverings (Dickens 1976:34). The floor of the house was slightly lower than the surrounding ground, and a raised clay hearth was located at the center of the house (Dickens 1976:94). Sometimes burials, refilled burials, storage pits, or borrow pits are located beneath the floor or just outside of the house (Dickens 1976:94). Storage pits appear to be rare on Pisgah sites, perhaps indicating that aboveground cribs and granaries were preferred during this time (Ward and Davis 1999:163-164).

By the Pisgah phase, people were planting crops such as corn, beans, squash, and sumpweed (Ward and Davis 1999:171). Corn does not appear to have become a more significant crop than small grains in the Eastern Woodlands until beans became important, around A.D. 1200 (Wagner 1988a; Yarnell 1993:22). Corn, beans, and squash (the “three sisters”) grow well together, as all three thrive in a moist environment, in moderately high temperatures, and in the acidic soils common in the Southeast (Hudson 1976:293). Corn and beans are complementary when grown together, since corn removes nitrogen from the soil and beans replace it (Hudson 1976:294). When eaten together, corn and beans provide a relatively good source of vegetable protein (Hudson 1976:294). Riverine land was ideal for corn agriculture, being rich in nutrients, easily tilled with simple tools, and well-drained (Hudson 1976:291). Women would also often cultivate kitchen gardens that were located near their houses (Hudson 1967:292). Foods that were traditionally collected before corn agriculture were still used during this phase, including nuts and fruits (Ward and Davis 1999:171; Yarnell 1976:217). Hunting and fishing also remained important during this period (Hudson 1976:291).

Contact period

The Qualla phase (A.D. 1450-1838) of the Appalachian Summit is a manifestation of the Lamar culture found across the northern half of Georgia and Alabama, most of South Carolina, and eastern Tennessee (Ward and Davis 1999:178). The people of the Qualla phase were part of Cherokee country. The Early Qualla phase dates to A.D. 1300-1500, and because of similarities between Qualla and Lamar ceramics, may have overlapped with the Late Pisgah phase (Rodning 2004:314-317). The Middle Qualla phase was from A.D. 1500-1650, and the Late Qualla phase spanned from A.D. 1650-1838 (Rodning 2004:314). The Qualla occupation at Smokemont appears to fall into the Late Qualla phase.

Qualla and Pisgah sites do not usually occur in the same areas. Qualla sites are generally located in the western and southern mountains, and Pisgah sites in the eastern and central mountains. However, in the central mountains along the Pigeon, Tuckasegee, and Oconaluftee rivers, both Pisgah and Qualla phase settlements are found (Ward and Davis 1999:179). The Cherokees experienced relative cultural and political stability during the first fifty years of the Late Qualla phase (Ward and Davis 1999:267). As European contact increased, warfare, disease, and trade impacted the Cherokees in the Appalachian Mountains, leading to a more dispersed population (Marcoux 2010; Ward and Davis 1999:272).

Qualla houses were typically circular or rectangular structures (Keel 1976:215). Cherokee domestic structures consisted of paired winter and summer houses (Marcoux 2010:110). Summer houses were rectangular and open, and located a few meters from the winter house. Winter "hot" houses (*osi*) were round or octagonal, with daub walls and a roof covered with soil (Marcoux 2010:110). Adair reported that inside of the circular posts, four large pine roof support posts were sunk into the ground, forming a rectangular space. Cane benches lined the interior walls, and were covered with woven cane mats (Hill 1997:70-71; Williams 1930:450-451). In the center of the winter house, a fire was built that burned all day and night in the winter, and was tended by individuals reclining on the benches who would use a piece of cane to push the ashes aside so the fire would blaze up again (Hill 1997:71; Williams 1930:451-452). In Cherokee mythology, fire was retrieved and tended by the water spider (*Kanane-ski Amai-yehi*) who carried fire to Earth on her back in a basket she wove, so the duty of maintaining household fires belonged to women (Hill 1997:70, Mooney 1900). Children and the elderly spent cold winter days in the house, and everyone gathered there at night (Hill 1997:70-71; Williams 1930:450-451).

Houses in the Appalachian Summit were generally dispersed farmsteads linked to small ceremonial centers rather than large concentrated populations common in other areas of the Southeast during this period (Keel 1976:216). By 1810 many Cherokees abandoned paired Qualla houses in favor of European-style log cabins (Marcoux 2010:110; Schroedl 2000:225).

Farming of corn, beans, squash, pumpkins, and gourds continued to be important during the Qualla phase. Additionally, nuts, fruits, berries, and wild animals remained important components of the diet (Ward and Davis 1999:189). During the Late Qualla phase, increased

European contact led to changes in subsistence practices due to the adoption of European plant and animal species (Ward and Davis 1999:272). In much of the Southeast, Native Americans adopted many European fruits and vegetables, including figs, peaches, and watermelons (Gremillion 1993; Hudson 1976:295). Chickens, pigs, horses, and to a lesser extent cattle were adopted from the colonists, but did not immediately replace wild meat sources in Native American diets (Hudson 1976:295).

Relevant Archaeobotanical Research in the Blue Ridge and the Ridge and Valley Provinces

Archaeobotanical remains have been collected from a number of excavated sites across the Appalachian Summit region since the 1960s. The most extensive investigation of Cherokee history and prehistory was the Cherokee Archaeology Project, a large research project conducted by the Research Labs of Archaeology (RLA) at the University of North Carolina, Chapel Hill in the 1960s. The Cherokee Project set out to study the origins of Cherokee culture (Ward and Davis 1999:17). As part of this project, archaeobotanical samples were analyzed from the Mississippian-period Warren Wilson site, and from the protohistoric Coweeta Creek site. Although the Cherokee Project intensively investigated Mississippian and Woodland period sites, the Protohistoric period was not as thoroughly researched on the Appalachian Summit (Rodning and VanDerwarker 2002:1-2). Until recently, the Coweeta Creek site provided the most abundant evidence for protohistoric and historic native lifeways on the Appalachian Summit (Rodning and VanDerwarker 2002:2). Since then, sites on the Appalachian Summit, including the Alarka Farmstead, Ravensford, and Smokemont, have provided additional evidence for studying Cherokee foodways through household remains (Figure 9).

Archaeological research along the Little Tennessee River was conducted by the University of Tennessee Department of Anthropology (UTK) during the Tennessee Valley Authority's Tellico Reservoir Project (Chapman and Shea 1981:62). Excavations led by UTK began in 1967, and ended in 1979 (Schroedl 1986:v). Archaeological sites along the Little Tennessee River span from the Early Archaic period through Historic Cherokee (Chapman and Shea 1981:64). The collection and analysis of archaeobotanical remains was an important aspect of this project (Chapman and Shea 1981:62). Further north in the Ridge and Valley province, the Greene County and Townsend sites have contributed additional data on plant use during the Woodland, Pisgah, and Qualla phases (Figure 9).

Sites in the Blue Ridge Province

Warren Wilson

The Warren Wilson site (31Bn29) was a Pisgah phase settlement that is thought to have been occupied between ca. A.D. 1250-1450 (Dickens 1976:14). First recorded in 1940, the Warren Wilson site excavations lasted from 1966 until 1968, and consisted of 11 houses, 12 partial palisade lines, and 33 features all from the Pisgah phase (Dickens 1976:25). Soil samples from six features were analyzed for archaeobotanical remains by Richard Yarnell (Dickens 1976:203-204). These samples included cultigens (corn, beans, squash, and sumpweed), as well as wild plant foods (hickory nuts, acorns, walnuts, butternuts, fruits, and small seeds) (Dickens 1976:204).

Garden Creek

The Garden Creek sites (31Hw1, Hw2, Hw3, Hw7, and Hw8) were located along the Pigeon River in Haywood County, North Carolina, and consisted of at least three mounds and a village (Dickens 1976:69). Garden Creek was excavated by the RLA from 1966 to 1967, with a focus on the Pisgah phase at the two largest mounds (Hw7 and Hw8). The village midden adjacent to Mound No. 2 (Hw8) was not excavated, but some testing was done on the village midden next to Mound No. 1 (Hw7). Two probable Pisgah phase house floors were found, one of which appeared to have been burned, and contained fragments of charred cane matting and animal food remains (Dickens 1976:88). Although archaeobotanical samples were taken from Garden Creek, they were not a part of Yarnell's analysis of Pisgah plant remains. A square post mold pattern was found at Mound No. 2 from the earliest stage of mound construction, dating to late in the Connestee phase, around A.D. 800 (Dickens 1976:100). Mound No. 1 contains ceramics with attributes of both Pisgah and Qualla series, suggesting that this site may have been used during the transitional period between Pisgah and Qualla (Dickens 1976:201).

Coweeta Creek

The Coweeta Creek site (31Ma34) consisted of village and townhouse occupations from the Early, Middle, and Late Qualla phase. The site was located at the confluence of Coweeta Creek and the Little Tennessee River in Macon County, North Carolina, and was excavated from 1965 to 1971 (VanDerwarker and Detwiler 2000:59). While Keel (1976) defined the Qualla phase based on findings of the Cherokee Project, many artifacts, including many paleoethnobotanical samples, remained unanalyzed. In the 2000s, there was a renewed interest in studying archaeological collections from the Cherokee Project, leading to several publications on the Coweeta Creek site (Keel *et al.*2002; Lambert 2002; Rodning and VanDerwarker 2002; VanDerwarker and Detwiler 2000,2002; Rodning and VanDerwarker 2002; Rodning 2002; Rodning 2004; Wilson and Rodning 2002). Paleoethnobotanical samples from fill deposits

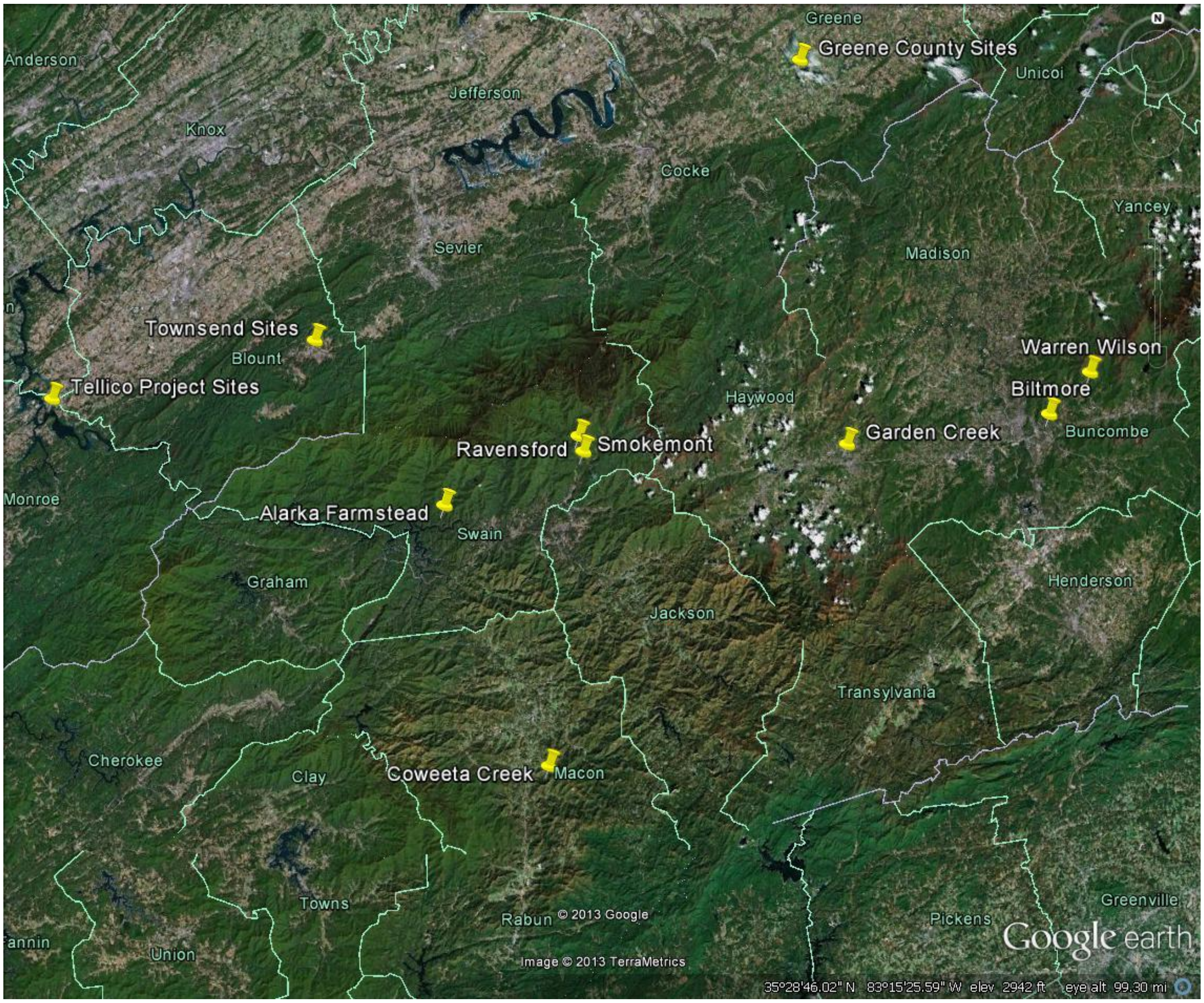

Figure 9. Approximate locations of relevant archaeological sites in the Blue Ridge and Ridge and Valley provinces.

related to episodic rebuilding of the townhouse at the site, as well as from pit features associated with households, were subsequently analyzed (VanDerwarker and Detwiler 2000, 2002). I will primarily refer to the household pit features when comparing Coweeta Creek to Smokemont, since the townhouse contexts represent a different type of activity. Plant samples from the Coweeta Creek site revealed that crops such as corn, beans, and squash, and native cultigens such as chenopod and little barley, were found in household trash pits as well as in the townhouse. Interestingly, while native fruits were found in both the townhouse and household trash pits, peach was located only in the townhouse samples (VanDerwarker and Detwiler 2000:70).

Ravensford

The Ravensford Project was the largest single research project ever conducted in Cherokee archaeology in North Carolina, covering more than 30 acres of land and revealing over a hundred structures (Keel 2007:3). Ravensford (31Sw78) is located roughly 3.5 miles south of the Smokemont site, near the Great Smoky Mountains National Park Oconaluftee Visitor Center and the Cherokee High School. Occupations at Ravensford span the Archaic through Contact periods (VanDerwarker and Alvarado 2013:3). So far, flotation samples from Ravensford have revealed interesting subsistence patterns. The reliance on nut collection and processing appear to have dropped at Ravensford during the Early Pisgah phase, and the focus on corn production appears to have increased and remained stable through the Early Qualla phase (VanDerwarker and Alvarado 2013:58). During the Late Qualla phase, an emphasis on corn cultivation seems to have declined, and there appears to be an increase in the use of nuts and fruits (VanDerwarker and Alvarado 2013:58).

Alarka Farmstead

The Alarka Farmstead site (31Sw273) was located on the Little Tennessee River in Swain County, North Carolina, and was completely excavated in 1997 (Shumate *et al.* 2005: 1.1). The site was composed of a Middle Qualla phase paired summer/winter house located in an isolated upland cove (Shumate *et al.* 2005: 1.1). Alarka was occupied around A.D. 1640-1670, and provided some evidence of indirect contact with Europeans (Shumate *et al.* 2005: 3.1). The food plant remains recovered from Alarka are scarce, with corn, beans, and squash being absent from the archaeobotanical assemblage (Crites 2005:7.6). Nevertheless, the Alarka site may reveal some information about plants used during the Middle Qualla phase when the house is compared to occupations at Smokemont.

Biltmore Mound

The Biltmore Mound site (31Bn174) was a Connestee phase mound site located along the Swannanoa River in Asheville, North Carolina. The site was occupied as early as A.D. 300. The earliest stage of mound construction began between A.D. 400 and A.D. 550, and the last mound stage was built around A.D. 580 to A.D. 600 (Kimball *et al*. 2010:44). Sixteen flotation samples from Biltmore Mound have been analyzed, producing an abundance of nuts, fruits, squash rind, and edible seeds. Over 2000 hickory nutshells were present in the Biltmore samples, 878 acorn shell fragments, and smaller amounts of black walnut, chestnut, and hazelnut (Kimball *et al.* 2010:51-52). Edible seeds from Biltmore include chenopod, knotweed, maygrass, little barley, and sumpweed. The sumpweed seeds found in Posthole 21 and ditch Zone C appear to be the larger, domesticated variety, providing the only evidence currently available for the presence of domesticated sumpweed from a Hopewellian context in the region (Kimball *et al*. 2010:52).

Sites in the Tennessee Ridge and Valley Province

Tellico Reservoir Project

The sites in the Little Tennessee River Valley were excavated during the Tellico Reservoir Project, and include Woodland, Mississippian, and Historic period settlements contemporary to those represented at Smokemont. Archaeobotanical remains from seven sites are reported by Chapman and Shea (1981). The Icehouse Bottom site (40Mr23) was occupied during the Connestee/Candy Creek phase. Martin Farm (40Mr20) and Jones Ferry (40Mr76) were Early Mississippian phase sites. Cherokee sites include Chota (40Mr2), Tomotley (40Mr5), Tanasee (40Mr62), Citico (40Mr7), and Wear Bend (40Ld107). Plant remains from the Little Tennessee River Valley have been extensively analyzed, making these sites important for understanding trends in plant use throughout the broader southern Appalachian region.

Archaeobotanical data from the Connestee/Candy Creek phase in the Little Tennessee River Valley indicate several edible seeds were used at Icehouse Bottom (Table 1). Nuts, including hickory, black walnut, acorn, and hazelnut, represented over 95 percent of the carbonized plant remains from this site. Chestnut is notably absent in the samples from Icehouse Bottom, possibly due to poor preservation or confusion with acorn shell (Chapman and Shea 1981:69). Some of the fruits eaten during this period include grape, maypop, honey locust, blackberry/raspberry, cherry/plum, and sumac. Icehouse Bottom is notable for being one of the earliest sites with evidence of maize, with two glume fragments recovered dating to A.D. 405±160 (Chapman and Keel 1979:160; Chapman and Shea 1981:73).

At Martin Farm and Jones Ferry, edible seeds remained a part of the diet, particularly sumpweed and bearsfoot. Fruits are well represented at this site, with over 3000 persimmons, as well as crab apple and grape. Maize, beans, and squash were all abundant during the Dallas phase (Chapman and Shea 1981:70-72). Interestingly, some tubers were uncovered from the Martin Farm and Jones Ferry sites as well, although generally tubers do not preserve well in the archeobotanical record.

Plant remains from the Cherokee sites in the Little Tennessee Valley still contained many edible seeds, particularly composites, including bearsfoot and sunflower. Maize, beans, and squash were well represented in these samples (Chapman and Shea 1981:70-72). Native fruits, including grape, persimmon, and cherry/plum remained important, and peaches had been adopted by this time. Other introduced European foods represented in these samples include cowpeas, field peas and tubers that may possibly be sweet potatoes (Chapman and Shea 1981:76).

Townsend

The Townsend sites are located west of the Great Smoky Mountains National Park in Townsend, Blount County, Tennessee, in Tuckaleechee Cove adjacent to the Little River. Four sites (40Bt89, 40Bt90, 40Bt91, and 40Bt94) underwent Phase III data recovery. Connestee and Cherokee settlements are located at the Townsend sites, but there were not any distinctive Pisgah occupations. Plant remains were analyzed from 20 Middle Woodland period features, and 24 Cherokee features (Hollenbach and Yerka 2011; Hollenbach *et al.* 2012:305). Nuts were common in the Connestee features, particularly acorn and hickory (Hollenbach and Yerka 2011). Corn, beans, and squash are abundant in the Cherokee samples. Nuts, edible seeds, and fruits were all present in the samples, indicating their continued importance in the Cherokee diet (Hollenbach *et al.* 2012). Although peach is present in many contemporary Cherokee sites in the

Ridge and Valley province as well as the Appalachian Summit, it was not found in any of the Townsend sites. It is unlikely that this is due to poor preservation, since the dense pits preserve as well as hickory and walnut shell, but instead may indicate how peaches spread throughout the region (Hollenbach *et al.* 2012: 313).

Greene County

The Birdwell (40Gn228) and Neas (40Gn229) sites are located in Greene County, Tennessee, adjacent to the Nolichucky River (Johanson 2012:1). These sites were excavated from 2009 to 2010, and contain occupations from the Late Paleoindian period through the Pisgah phase (Johanson 2012:1). At the Birdwell site, one Connestee pit feature (Feature 42A) contained a significant amount of carbonized plant remains, and a broad variety of plant taxa. Excavations at the Birdwell site also revealed a Pisgah phase house floor (Feature 68) that contained large amounts of cane, acorn, and corn. At Neas, another Pisgah feature was excavated, a basin-shaped pit (Feature 119) that contained corn, hickory nutshell fragments, and some chestnut shell (Johanson 2012).

Although plant remains have been collected from a number of other archaeological sites in the Appalachian Summit, including Connestee phase sites such as the Harshaw Bottom site (31Ce41) (Gremillion 1989), the California Creek site (31Md60) (Crites 1998), site 31Bn174 (Oliver 1988), and site 31Bn335 (Wagner 1991), the data from these site reports have not been widely published (see Wetmore 2002 for a brief discussion of plant remains from these sites). Because no quantitative comparisons are made between the archaeobotanical data at Smokemont and other sites in the Appalachian Summit, a representative sample of archaeological sites in the

Table 1. Plant Remains from the Lower Little Tennessee Valley (Chapman and Shea 1981+).

Taxonomic Name	Common Name	Connestee/Candy Creek* (40Mr23)	Martin/Hiwassee Island* (40Mr20 and 40Mr76)	Cherokee* (40Mr2, 40Mr5, 40Mr63, 40Mr7, 40Ld107)
Acalypha sp.	Copperleaf			
Amaranthus sp.	Pigweed	9		
Ambrosia sp.	Ragweed		7	34
Asteraceae	Composite family	3	384	332
Carex sp.	Sedge			1
Chenopodium sp.	Goosefoot	60	250	175
Crataequs sp.	Hawthorn		3	1
Diospyros virginiana	Persimmon	2	4	13
Fabaceae	Bean family	11	32	22
Galium sp.	Bedstraw	85	17	19
Gleditsia triacanthos	Honey locust	10	76	2
	Seed pod			1
Helianthus annuus	Sunflower	13	6	77
Ipomea sp.	Morning glory		61	34
Iva annua	Sumpweed	1	21	2
Malus sp.	Crab apple			
Nyssa sylvatica	Blackgum			1
Panicum sp.	Panic grass			1
Passiflora incarnate	Passion flower	6	35	192
Phalaris caroliniana	Maygrass	131	40	27
Phaseolus sp.	Beans			922
Phytolacca americana	Pokeweed	9	2	5
Poaceae	Grass family	27	13	10
Polygonum sp.	Knotweed	10	385	347
Polymnia uvedalia	Bearsfoot	17	17	112
Prunus persica	Peach			283
Prunus sp.	Cherry, plum	4	4	14
Rhus sp.	Sumac	1		3
Roaceae	Rose family	4		
Rubus sp.	Blackberry, raspberry	1	5	10
Scirpus sp.	Bulrush			1
Vigna unguiculata	Cow pea			183
Vitis sp.	Grape	49	47	173
Xanthium sp.	Cocklebur			34
Zizania aquatic	Wild rice			13
	Roundish type A	34		
	Tubers			128

*Total counts, including both whole seeds and seed fragments

+Maize, squash, and nuts were also present (see text for distribution/presence within each period), but raw counts were not included in Chapman and Shea's table

Appalachian Summit from published or easily accessible site data are qualitatively compared to Smokemont.

Features and Structures at Smokemont

There were four structures uncovered at the Smokemont site: two Late Qualla phase (Cherokee) and two Pisgah phase structures. Structures 1 and 3 were determined to be Cherokee, and were perhaps a paired winter/summer house. Structures 2 and 4 were Pisgah phase houses. Structures 3 and 4 were excavated by the ARL in 2007, and Structures 1 and 2 were excavated in 2008-2010 (Angst 2013:13, 32).

Connestee Features (Features 122 and 132)

Several Connestee phase pit features were located below Structure 2 (Figure 11). Flotation samples taken from two of these features in 2010, Features 122 and 132, were analyzed as part of this thesis. A large rock-filled pit (Feature 129) was excavated in 2012, and analyses of the samples taken from that field season are underway.

In 2010, only the south half of Feature 122 was excavated. The rest of the feature (the north half) was excavated in 2012, and samples taken will be analyzed by the ARL. Two of the posts from the Pisgah house intruded into Feature 122 (Angst 2013:39). Feature 122 contained pottery, lithics, fire-cracked rock (FCR), and charred material (Angst 2013:40). A radiocarbon date of charred nutshell from this feature provided an uncorrected date of AD: 527 ± 74, placing it within the Connestee phase (Angst 2013:40).

Feature 132 was located beneath the Pisgah house, and contained pottery, lithics, FCR, and charred material (Angst 2013:40). Most of the pottery from this feature (70 percent) was Connestee Plain, some (n=8) sherds were Pigeon phase, and three were indeterminate (Angst

2013:40-41). Charred nutshell from this feature was also submitted for radiocarbon dating, and provided an uncorrected date of AD: 442 ± 82, falling within the Connestee phase as well (Angst 2013:41)

Pisgah Structures (Structures 2 and 4)

Structure 2 (Figures 10 and 11) was exposed in 2007, and was excavated in the 2009 and 2010 field seasons. Structure 2 was a rectangular Pisgah phase house with parallel entry trenches, similar in size to Structure 4. Sixty features were identified in Structure 2, and the majority of those (n=52) were postmolds. One feature was interpreted as a probable human burial, and was not excavated. The house measured about 5 m by 5 m, and had a small, central hearth. Soil samples from two of the postmolds and the central hearth of Structure 2 yielded an abundance plant remains (Angst 2013:17-18, 32, 34).

Radiocarbon dates for Structure 2 are problematic since the three samples submitted provided different dates that do not overlap, even at two sigma. The first date from an interior postmold was a little too early at an uncorrected date of A.D.1084 ± 67. The second date from another interior postmold was an uncorrected date of AD: 1349 ± 44, putting it within the Pisgah phase at A.D. 1350. The third date from charred hickory nutshell found in another postmold was an uncorrected date of 6188 ± 62 B.C., which was much older than the structure. Because the second date fits more appropriately within the known time period houses like Structure 2 were constructed, it has been determined to be the most likely accurate date (Angst 2013:34).

There were very few artifacts found within the Pisgah phase household context. Only four triangular projectile points and twenty sherds were associated with the Pisgah occupation.

Although there were ample charred plant remains present in Structure 2, faunal remains were almost completely absent (Angst 2013:135).

Structure 4 was identified by a concentration of postmolds surrounding a hearth (Angst 2008:68). Soil samples for analysis of plant materials were taken from two postmolds, but only one yielded plant remains (Carmody and Hollenbach 2008:140). Because there was a great diversity in the plant remains from this Pisgah phase postmold, it may have been filled with refuse after it was removed (Carmody and Hollenbach 2008:141). The postmold did contain a notably large number of ragweed seeds (n=49), suggesting that native cultigens were still being actively grown alongside corn and other crops during this period (Carmody and Hollenbach 2008:141). Structure 4 was poorly preserved and yielded a limited amount of plant data, which may make comparing the plant remains recovered from one postmold in this structure to plant remains from the other Pisgah house difficult. Therefore, I will not refer to the samples from Structure 4 any further in this thesis.

Qualla Structures (Structures 1 and 3)

Structure 1 (Figures 12 and 13) was exposed in 2007, and was excavated from 2009 to 2010. Structure 1 was a circular Cherokee winter house with a central hearth and a 10- to 15-cm-thick floor midden. Although part of the structure was covered by the road and remained unexposed, it appears to have been around 7.1 m in diameter. The floor midden was excavated in one partial and thirteen complete 1-m by 1-m test units. Soil samples were collected from each test unit, and from each zone when applicable. The floor midden covered the hearth, suggesting that either the structure was abandoned and used as a disposal area, or that the midden washed evenly across the basin after abandonment. Structure 1 is assumed to have been occupied sometime between 1715 and 1750 based on the periods of occupation at the nearby settlements of Townsend, Tomotley, and Chota-Tanasee (Angst 2013:23-27, 30).

Several European artifacts were recovered from Structure 1, including 424 beads, a few metal objects that may have been decorative or utilitarian in function, and peach pits (Angst 2013:136-137). Ceramics found in association with Structure 1 were from Middle and Late Qualla phases (Angst 2013:138). Faunal remains were recovered from the floor fill, and consisted of a wide variety of animals, including a large number of frog and toad bones (Angst 2013:138). The reason for such an abundance of frog and toad remains is not clear, but similar assemblages have been uncovered at nearby Late Qualla sites, including Coweeta Creek, Ravensford, and Townsend (Angst 2013:138; Compton 2010; Hollenbach *et al*. 2012; VanDerwarker and Detwiler 2000). Frogs and toads may have been eaten, or may have been processed for medicinal or hallucinogenic purposes (Runquist 1979:285; Ward and Davis 1999:171).

Structure 3 (Figure 13) consisted of four postmolds, three of which contained Qualla series ceramics (Angst 2008:64). Because of its proximity to the Qualla winter house (Structure 1), Structure 3 has been interpreted as the remains of an associated summer house (Angst 2008:64). Flotation samples were collected and analyzed from these four postmolds (Carmody and Hollenbach 2008:132). The postmolds from Structure 3 contained evidence of introduced and native crops, as well as peach pits, glass beads, and brass tinklers (Carmody and Hollenbach 2008:141). Because Structure 3 is not as well-preserved as Structure 1, I will limit my discussion of the plant remains from these samples.

Figure 10. Structure 2 Pisgah phase house (Angst 2013).

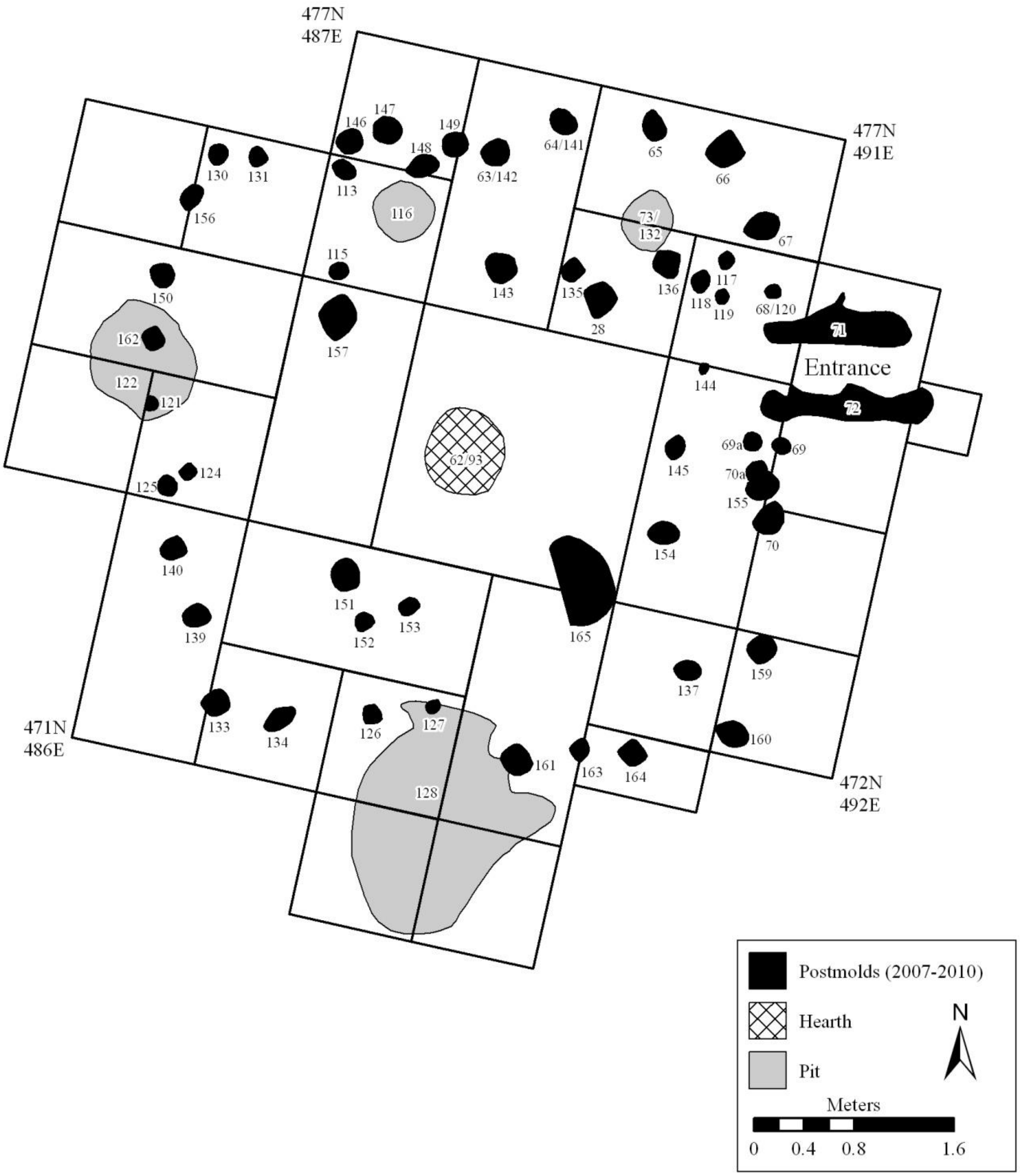

Figure 11. Pisgah and Connestee phase features associated with Structure 2 (Angst 2013).

Figure 12. Structure 1 Late Qualla phase house (Angst 2013).

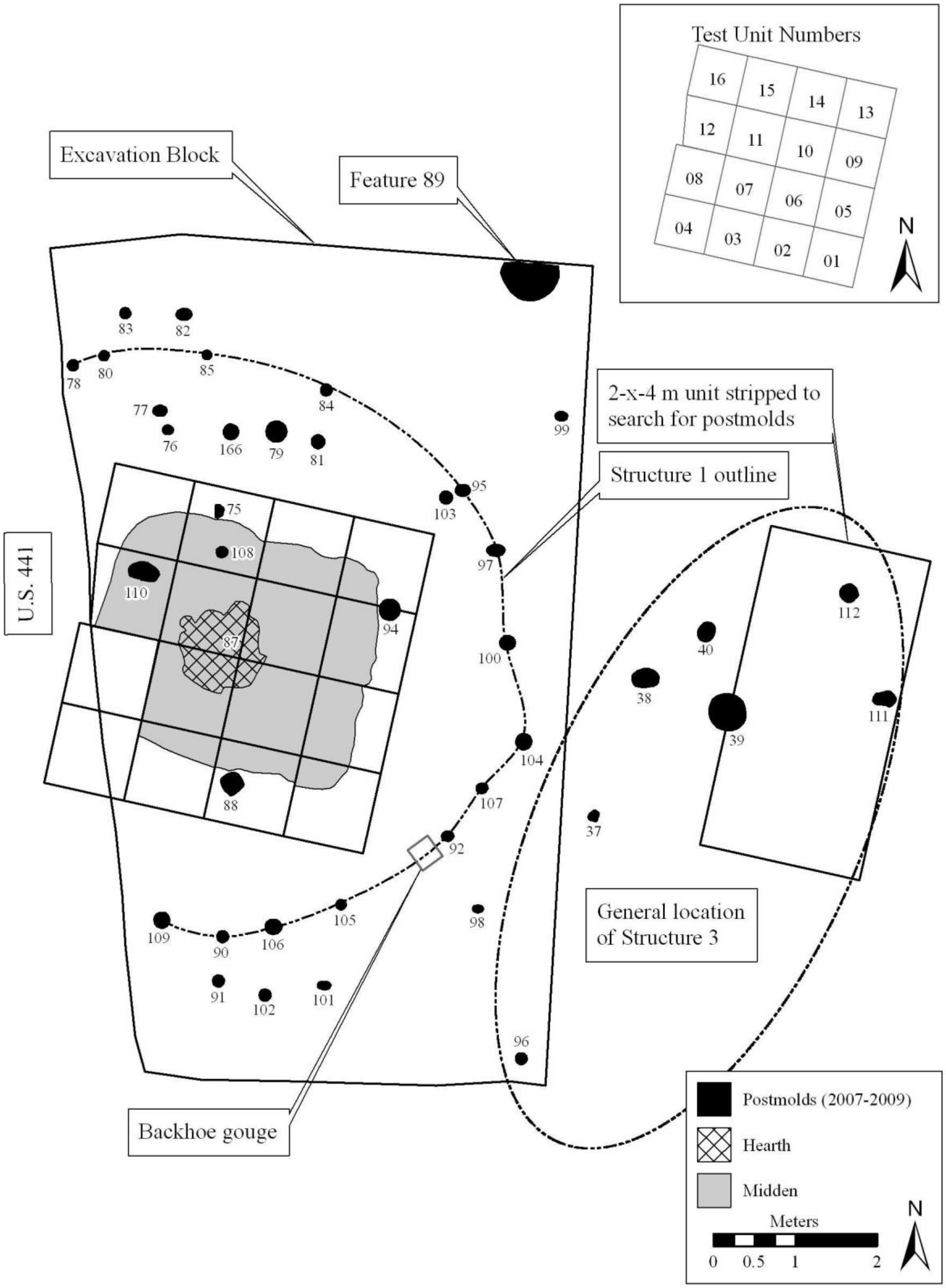

Figure 13. Late Qualla phase features associated with Structure 1 (Angst 2013).

Chapter 2

Materials and Methods

Preservation and Recovery

Although paleoethnobotany had been practiced in Europe since the early 1800s, plant remains were not regularly collected from American archeological sites until the mid-twentieth century (Pearsall 2000:4). It was in the 1950s and 1960s that interest in reconstructing subsistence and paleoenvironments led American archaeologists to collect and analyze macrobotanical remains from archaeological sites (Pearsall 2000:5). As the New Archaeology of the 1960s led to an increased interest in questions related to subsistence, ecology, and economy, ecofacts such as archaeobotanical remains became as important as artifacts in studying the past, leading to a substantial growth in the field of paleoethnobotany (Watson 1997:18). From the 1960s to 1970s, Stuart Struever was a pioneer in the standardization of plant recovery methods, leading to the “Flotation Revolution” in which retrieval systems, analytical modes, and systematization rapidly evolved (Watson 1997:21-22). It was after Struever (1968) published a standard flotation methodology that archaeologists began to regularly look for botanical macroremains on archaeological sites (Pearsall 2000:6). During the 1970s and 1980s archaeobotany also underwent a theoretical revolution, leading to a careful reexamination of the influence of natural, cultural, and analytical processes that may influence the archaeobotanical record (Miksicek 1987:212-213).

Natural conditions can greatly influence the preservation of plant remains (Miksicek 1987:213). While frozen sites, anaerobic environments like peat bogs, and the extreme aridity found in some caves and rock shelters tend to be ideal for the preservation of plant remains, carbonization is the most common cause of macrobotanical preservation at open-air sites (Miksicek 1987:219). Due to the humid climate and highly acidic soils of the Southeast, macrobotanicals at open-air sites like Smokemont must generally be carbonized to preserve through time (Yarnell 1982:3). Because elemental carbon is practically indestructible and offers no source of sustenance to microorganisms, it remains unchanged indefinitely (Dimbleby 1967:100). Carbonization reduces seeds and fruits to 50 to 60 percent elemental carbon; although this makes them resistant to further decay, mechanical damage can still destroy them (Miksicek 1987:219). Fragile plant remains can be destroyed by freezing and thawing, bioturbation, and anthropogenic effects that may occur at any point from deposition to excavation (Reitz and Scarry 1985:11; Yarnell 1982:2). Another factor of preservation that must be considered is that all plant remains do not have the same likelihood of carbonizing. There is a relatively narrow window during burning in which plant remains become carbonized in an identifiable state, and not all plant parts respond to being burned in the same manner. This can affect how plants show up in the archaeological record, with some plant remains such as wood being more likely to survive carbonization than other remains like seeds and squash rinds (Wright 2003:581-582).

There are a number of ways that cultural processes contribute to how macrobotanicals are preserved in the archaeological record. Ethnographic accounts of plant use by non-Western cultures provide paleoethnobotanists with a starting point for analyzing archaeobotanical remains (Ford 1988:220). Through ethnographic records, paleoethnobotanists can better understand the ways people collect, process, consume, and discard plants, revealing how they eventually become carbonized. Plants can be accidentally burned if they are spilled or discarded into a fire during cooking (Yarnell 1982:2). Seeds may "rain" into a fire, either because they were blown into it, fell out of roofing material, or may have even come from plants hung to dry in the rafters of a structure (Minnis 1981:145). Plants may be purposefully burned as fuel, or simply as waste tossed or swept into a hearth (Reitz and Scarry 1985:10). Whether intentional or accidental, structures may be burned, charring any plant food or debris within. Storage pits may have been burned if they were abandoned or contained spoiled foods (Reitz and Scarry 1985:10).

The ways plant foods are prepared for consumption and storage can also affect how often they show up in the archaeological record. Seeds that were pulverized before being processed near a fire are less likely to be represented than those that have commonly been parched (Yarnell 1982:2). People tend to be consistent in activities like food processing, so it may be assumed that the more often a plant was used, the more frequently it will appear in the archaeological record (Yarnell 1982:4). Cultural biases may lead to the selection of certain wood types, or cause edible plant foods to be used for other purposes, such as for fuel (Ford 1988:219). Additionally, how people altered the landscape can influence the abundance of weedy edible plants and other "camp followers" that end up charred in archaeological features (Ford 1988:219; Yarnell 1982:5-6).

How archaeologists collect and process paleoethnobotanical samples can also affect plant data (Miksicek 1987:213). When collecting samples, it is usually impossible to predict which contexts contain macroremains, and it is often difficult to see charred plant remains during excavation (Pearsall 2000:66). Therefore, "blanket sampling," or taking a soil sample from each level in each unit and from all features, will avoid the problem of predicting where plant remains will occur, and provide more flexibility during later analyses (Pearsall 2000:66-67). A standardsized soil sample should be taken from each context on a site (Pearsall 2000:75). The standard size of soil samples taken in the Eastern Woodlands of the United States is ten liters (Fritz 2005:786). Ten-liter soil samples are generally considered large enough to provide evidence of macrobotanicals if present in a provenience. A rule of thumb is that if there is plenty of carbonized wood in a sample, then there is a good chance that a sufficient number of seeds are also present (Pearsall 2000:76).

Techniques for processing soil samples to recover plant remains include dry screening, water screening, and flotation. Dense concentrations of charred plant remains, such as food caches and cob-filled features, are carefully removed as intact as possible, then carefully handpicked or screened through nested geologic sieves in the lab to reduce damage that may be caused by flotation (Fritz 2005:781). Any recovery method can create biases in the data, leading to inaccurate or misleading interpretations. Dry screening is a technique not commonly used in the initial recovery of plant remains, since charred plant material is often too small to be caught in the mesh used, and may be damaged in clay soils that have to be pushed through the screen. Water screening involves spraying a soil sample over a series of nested screens. A type of water screening, water sieving, involves dipping mesh-bottomed baskets of dirt into water and shaking the basket until the dirt has washed away. Water screening can cause small, delicate plant remains to be destroyed or lost, particularly if the water pressure is too high (Wagner 1988b:18-19).

Flotation is the process of segregating materials of different densities when a medium (usually water) is added whose density is between that of the materials in the sample (Pearsall 2000:20). A soil sample is placed in a screened container in water, and agitated. This allows smaller, lightweight objects to float to the top where they can be scooped off as the "light fraction" (Wagner 1988b:19). Heavier materials sink to the bottom, the soil falls through the screen, and artifacts are captured as the "heavy fraction" of the sample (Wagner 1988b:19). Soils that do not work well for flotation, like clay soils that clump and clog up the screen, may need to be deflocculated with chemicals such as sodium hexametaphosphate ($NaPO_3$), sodium bicarbonate ($NaHCO_3$), or hydrogen peroxide (H_2O_2) (Pearsall 2000:88). If significant quantities of plant materials remain in the heavy fraction, then the samples may be refloated in water; chemical solutions such as zinc chloride ($ZnCl_2$) that increase the density of the solution were frequently used in the 1970s, but are not commonly used today (Wagner 1988b:21).

Flotation systems are either hand-floated or machine-assisted. Hand-flotation involves agitating the soil by hand and scooping or siphoning the light fraction off of the top, while machine-assisted flotation provides a spray of water from the bottom of the screen and capture of the light fraction that overflows into a fine mesh. Hand-flotation and scooping tend to be less consistent than machine-floatation since operator error can increase the chances of damage, loss, or inconsistent recovery (Wagner 1988b:20). Although flotation is a better system of archaeobotanical recovery than most other methods, this process can also affect the plant data collected. The way in which flotation soil samples and floated plant remains are handled can have an effect on the quality of the data collected. Completely drying soil samples before flotation may cause some plant remains to fragment when added to water (Wagner 1988b:23). Similarly, refloating a sample after allowing it to completely dry can cause additional breakage. Some plant remains with particularly hard structures, such as plum pits and honey locust seeds, may fragment due to wetting/drying and handling (Yarnell 1982:2). Although there is no standardized flotation methodology, the different methods and equipment used should be adequate as long as the smallest possible mesh screen is used during the process, and the soil samples are not screened prior to flotation. Flexibility in methodology is necessary to accommodate each unique set of sediments, budgets, and available equipment (Wagner 1988b:28).

Plant Recovery Methods at Smokemont and Comparable Sites

When possible, soil samples at Smokemont were at least ten liters, were taken from each feature as well as from the floor midden in the Qualla structure (test units), and were taken from each zone of a feature or test unit when applicable. Flotation samples were not taken from some of the zones from the Connestee features. These zones were instead dry-screened, and the sample volume was estimated in the field (Table 2). Flotation samples were not processed in the field, but instead were bagged and labeled before being brought back to, and floated at, the ARL. Due to time and budget constraints, all flotation samples taken in 2010 were not analyzed. Some of the analyzed samples contained no non-wood plant remains, and so are not discussed here.

The archaeobotanical samples from Smokemont analyzed as part of this thesis are listed in Table 2. Eight Connestee phase, two Pisgah phase, and nine Late Qualla phase samples are discussed here. The sample volume is the total liters of soil screened or floated to collect the charred plant material. The sample weight is the total weight of the sample before the plant remains were sorted out. Sample weight includes contaminants, such as modern debris greater than 2.00 mm, and residue, which is the residual material in the pan (<0.71-mm) after it has been scanned for identifiable plant remains not found in the sample portions from the larger screens. Some samples were too large.

Table 2. Archaeobotanical Samples from Smokemont (31Sw393).

BCL# *Phase*	Context	Zone	Level	Depth (cmbed)	Sample Volume (L)	Sample Weight (g)	Subsample Weight (g)	Plant Weight (g)	Wood Weight (g)
Connestee									
07-340†	F132 N1/2	B		15-74	36‡	12.29		9.65	3.21
07-346†	F122	B		66-82	10	550.22	526.31	99.26	59.97
07-352†	F132 S1/2	A		3-20	23‡	10.24		6.53	5.25
07-358†	F132 S1/2	B		15-80	127‡	10.22		7.25	5.53
07-359*	F132 S1/2	B		15-60	42	406.79	99.80	34.03	16.54
07-362†	F122 S1/2	B		82-94	24‡	94.52		41.54	41.20
07-366†	F122 S1/2	D		98-101	17‡	3.05		3.01	2.69
07-370†	F122 S1/2	E		103-105	19	366.00		36.13	34.91
Pisgah									
07-195*	F93 W1/2 Hearth	A		35-38	7	37.12		2.23	0.93
07-196*	F93 W1/2 Hearth	B		35-39	4	16.03		0.17	0.11
07-327*	F151	A		35-89	37	419.60		40.80	36.34
07-344*	F157	A		30-101	45	282.53	167.32§	16.44	15.25
Late Qualla									
07-105†	TU 7	A	1	11-21	10	74.75		3.54	2.02
07-106†	TU 10	A	1	14-24	10	43.23		2.82	2.20
07-117†	TU 7	B	1	27-30	10	56.07		2.90	2.13
07-130†	TU 5	A	2	18-26	10	65.36		3.63	2.92
07-137†	TU 11	A	1	9-18	10	43.52		1.97	1.37
07-142†	TU 7	D	1	43-49	10	41.72		3.56	2.36
07-199*	F 87 Hearth			20-35	12	142.08		8.26	6.65
07-200*	F 87 N1/2 Hearth	E		21-40	19	450.49		5.00	3.27
07-209*	F 87 N ½ Hearth	G		23-34	2.5	134.1		6.31	4.93

* Samples identified by Hollenbach and Purcell
† Samples identified by Hollenbach
‡ Samples were dry screened
§ All of light fraction was scanned, but heavy fraction was subsampled.

to be analyzed within a limited amount of time, so these were subsampled. Total plant weight combines the heavy and light fractions, and includes the wood weight.

Soil samples from Smokemont were processed at the ARL using machine-assisted flotation to recover plant remains present in each soil sample. Before being processed, each sample was measured (in liters) in the laboratory, and the volume was recorded as the total sample volume. Samples were floated in a SMAP (Shell Mound Archaeological Project)-style machine, a metal barrel with a window-screen-sized mesh (around 1.6-mm mesh) placed inside of the top, into which the soil sample was deposited. The barrel was filled with water from the bottom, and the sample was agitated in the screen so the sediments would fall through the screen to the bottom of the barrel. Soil was therefore removed, leaving the heavy fraction of the plant sample in the screen. The light fraction, consisting of the lighter macrobotanicals such as seeds, floated to the top as the soil was agitated, where it was siphoned off into a very fine 0.05-mm mesh cloth. After the macrobotanicals were removed, the water was drained from the SMAP machine and fine sediments were discarded. The screens that had captured the floated materials were bundled up, and allowed to completely dry before being sifted and identified.

Soil samples from the Coweeta Creek site (31Ma34) were collected and processed before the widespread use of flotation (VanDerwarker and Detwiler 2000:61). Because all soil samples were water screened through a 1/16-inch mesh, the plant assemblage from the site is biased towards larger, more durable plant remains. Although the recovery method of plant remains at Coweeta Creek was not ideal, numerous small seeds from fruits and weedy plants were still recovered (VanDerwarker and Detwiler 2000:61). Samples from Coweeta Creek were collected from features associated both with the village and the townhouse constructions at the site, but only the village features were associated with domestic activities (VanDerwarker and Detwiler 2002:22).

Plant remains were recovered from six features at the Warren Wilson site (31Bn29), and were analyzed by Richard Yarnell (Dickens 1976:203-204). Plant remains from the Warren Wilson site came from features that were pits, depressions, palisades, and one baked-clay hearth overlaying a burial (Dickens 1976:54-63). Soil from these features was first washed through a 1.3-mm mesh screen, and then the charcoal was separated by flotation (Dickens 1976:202). As a result of these methods, small seeds would have been lost, causing the samples to be somewhat biased towards larger plant remains.

At the Ravensford site (31Sw78), 596 flotation samples were collected, of which 146 samples were floated and analyzed (VanDerwarker and Alvarado 2013:8). Samples of various volumes were taken from features and the floor of a burnt structure (VanDerwarker and Alvarado 2013:6). Plant remains at Ravensford were collected from features from Late Archaic to Protohistoric periods (VanDerwarker and Alvarado 2013:26), but the analysis of these samples focused on the Late Qualla phase. As such, Ravensford is compared to the Late Qualla features at Smokemont.

Soil samples from the Biltmore Mound were all processed by flotation. Sixteen samples have been analyzed to date. Flotation samples came from six postmolds, five pit features, and from three zones of a filled ditch (Kimball *et al*. 2010:51).

Plant remains that were collected during Phase II excavations at the Alarka Farmstead site (31Sw273) came from 30 features, 10 postmolds, and 11 unit strata (Shumate *et al.* 2005: 4.5). Of the soil samples collected, 46 were analyzed, including 17 feature samples, seven samples from the house floor, 13 structural elements associated with the destruction of the winter house, and eight postmolds (Crites 2005:7.1). Most of the soil samples were floated, although there were a few samples that were combined waterscreen samples from the same provenience. These waterscreened samples usually contained one seed or one piece of wood charcoal (Crites 2005:7.1). Structural element remains from the destruction of the winter house that were *in situ* were collected by hand and waterscreened in the field through a 0.25-inch screen (Crites 2005:7.1).

At the Greene County and Townsend sites, flotation samples were taken from each provenience (Creswell 2011:9; Johanson 2012:36). Column samples were taken from the units at Greene County as well. Flotation samples from Greene County were systematically collected from the southwest 30-cm-by-30-cm corner of every test unit in 10-cm levels (Johanson 2012:36). Soil samples from both Greene County and Townsend were processed at the ARL using methods similar to those used to process soil samples from Smokemont.

The Tellico Project took place during the early years of the “flotation revolution,” so the recovery of archaeobotanical remains was not consistent between sites sites, and was not always systematic within sites (Chapman and Shea 1981:62). All samples from Icehouse Bottom, Citico, and Wear Bend were floated. Samples from Martin Farm and Jones Ferry, Chota, Tanassee, and Tomotely were waterscreened through a 1/16 inch mesh, subsampled, and the carbonized plant remains from the heavy fraction were floated (Chapman and Shea 1981:65). This method of collecting archaeobotanical remains would have resulted in the loss of small seeds, causing the samples to be biased towards larger plant remains.

Identification

Once the samples were dry, the macrobotanical remains from Smokemont were analyzed under a stereoscopic microscope at 10- to 40-power magnification using the identification techniques described by Pearsall (2000). Plants were identified using Martin and Barkley's (1961) *Seed Identification Manual*, and the PLANTS Database (United States Department of Agriculture – Natural Resources Conservation Service [USDA-NRCS] 2011), as well as modern comparative specimens (Hollenbach and Purcell 2013). Samples with large amounts of charred material were subsampled using a riffle splitter, and a half or a quarter of the sample was analyzed, depending on the size of the entire sample.

First the provenience and weight of the light fraction and heavy fraction of each sample was recorded, and then the sample was sieved through a series of nested geologic sieves. This process split the sample into >2.0-mm, 1.4-mm, and 0.75-mm portions, with pan being anything smaller. Some samples were also sieved through a 1.0-mm, 0.50-mm, and 0.35-mm screen in order to make the sample easier to scan. All sample fractions were scanned for macrobotanicals, although if the 0.50-mm or 0.35-mm screens had been used, the pan was not scanned since any small seeds would be captured in the 0.35-mm screen. "Contaminants" in the >2.0 mm of the heavy fraction, which include modern debris such as small rocks, roots and grass, were weighed and discarded. All charred plant material <2.0 mm was separated into discrete classes, counted, weighed, and placed in separate containers (Pearsall 2000:102). Any non-plant material in the less than 2.0 mm portion of the sample, such as rocks and concretions, were weighed and retained as "residue." Bone, lithics (microflakes), ceramics, and shell, when present in a sample, were weighed and/or counted and placed into separate containers.

All non-wood taxa in the >2.0 mm fraction were identified down to the lowest taxonomic level possible. Generally, the majority of each sample was wood, which was not identified more specifically. Wood fragments were not counted in the >2.0 mm fraction, but were weighed and placed in a separate container. Although counting wood recovered in a sample does not provide much useful information, wood weights are recorded since they can be used in quantitative analyses such as comparison ratios (Pearsall 2000:203).

In fractions less than 2.0 mm, charred material was scanned for seeds, seed coats, seed fragments, fruits, and for plant remains not represented in the larger fraction (such as hickory nut). Because acorn shell is fragile and is not always represented in the >2.0 mm materials, acorn fragments were also taken out of the 1.4 mm fraction when present. Wood was not removed from the less than 2.0 mm fractions because it has been shown to not have a substantial effect on ratio analyses (Pearsall 2000:107). Any of the scanned sample that remained in fractions less than 2.0 mm was weighed and bagged as “residue.”

Seeds that were too fragmented to be identified were labeled “unidentifiable seed.” Seeds whose identifications were unknown were labeled “unidentified seed,” and often accompanied by a description and/or drawing of the seed to aid in future identification and to assist in identifying similar unidentified seeds that may occur in other samples. Nutshell was treated in a similar manner, and any non-wood macrobotanical remains that could not be identified were labeled as “unidentified” or as “unidentifiable.”

Analysis of a sample was complete when the entire sample had been scanned for macrobotanicals, and all identified plant remains had been counted, weighed, and placed into containers as described above. Any residual material was weighed and bagged, and the weights of all materials (plant remains, contaminants, residue, etc.) after being analyzed were added up and compared to the initial weight of the plant sample before being screened through the sieves. Samples will be curated in the museum collection of the Great Smoky Mountains National Park. All "Archaeobotanical Analysis Forms" will remain at the Archaeological Research Laboratory-University of Tennessee, Knoxville.

Quantitative Methods

Quantitative analysis of plant remains must take into consideration the influences natural, cultural, and recovery processes have on archaeobotanical data. Consequently, taxa frequencies alone do not quantitatively reflect human-plant interactions (Popper 1988:53). Given the nature of paleoethnobotanical remains, which are subject to biases from the time they are collected by prehistoric people until they are excavated and quantified (Miksicek 1987:212), some types of rigorous statistical analyses may be inappropriate. Comparing data collected from different sites and/or using different recovery techniques can create additional difficulties in data analysis (Wagner 1988b:29). Despite some limitations, some quantitative measurements of plant remains are useful for describing patterns in the data. No one method of quantifying plant data is appropriate or even useful in every analysis, so methods must be selected that are suitable for data available and the research questions asked (Popper 1988: 52-53). Different quantitative measurements make various assumptions about archaeobotanical data, and differ in the types of information they provide about the data (Popper 1988:54). The analysis of the paleoethnobotanical samples from Smokemont uses non-multivariate methods, including tabulated counts and weights, ubiquity and ratios.

Absolute counts are rarely reliable measurements for archaeobotanical remains (Popper 1988:60). When analyzing absolute counts, unevenness in the data can obscure patterns (Pearsall 2000:194). Standard counts are included because they are used in further quantitative and statistical analyses (Popper 1988:60). When interpreting ubiquity and ratios, it is necessary to refer back to standard counts and weights to insure that unusual or significant aspects of individual samples are not being overlooked (Scarry 1986:193).

Ubiquity, or presence analysis, is a method for quantifying archaeobotanical data that disregards absolute counts, and instead assesses the degree of presence or absence of a taxon among multiple samples (Popper 1988:60-61). Ubiquity measures how often a plant occurs throughout deposits on a site (Pearsall 2000:212). By measuring ubiquity, the frequency score of one taxon does not affect the score of another, and all taxa are scored equally, reducing biases in preservation of different taxa that influence absolute counts (Popper 1988:60). Ubiquity is useful for determining the relative importance of taxa; however, this method can produce inaccurate frequency scores if used improperly (Popper 1988:61). Because each taxon is given equal weight within each analytical sample, mistakenly splitting the sample may artificially inflate the frequency score of taxa (Popper 1988:61). To prevent misinterpretation of the Smokemont plant data, samples that were from the same feature and zone (samples that were bisected and analyzed as north half and south half, for example), were combined and considered a single sample (Table 3). This affected five samples, three that were from Feature 132 Zone B, and two from Feature 122 Zone B. While ubiquity can reveal general trends in the data, it can also obscure cultural patterns of plant use where the frequency of use remains the same, but abundance changes (Popper 1988:64; Scarry 1986:193). For example, if a particular taxon is found in an unusual abundance in only one context, then the significance of that taxon may not be evident in ubiquity measures.

Ranking is potentially a more precise method of measuring plant frequencies than ubiquity because ranking adjusts for non-cultural sources of patterning. This is achieved by converting absolute counts of the data into an ordinal scale with a ranking scheme defined by the researcher (Popper 1988:64). Scales of abundance are determined for each taxon based on likelihood of preservation, allowing taxa to be independently evaluated. Ranking is the most useful when plant remains have excellent preservation and there are high counts of taxa in each sample (Popper 1988:66). Because it has many issues, ranking is not commonly used in paleoethnobotany (Fritz 2005:795). There is a high amount of subjectivity involved in ranking, and it may cause complications and potential error (Popper 1988:66). Because of its many issues and constraints, ranking will not be used to analyze samples from Smokemont.

Ratios are a commonly used by paleoethnobotanists to standardize count or weight data, revealing patterns within them (Pearsall 2000:206). Ratios can be used to compare samples of unequal size, from different circumstances of deposition or preservation, and to compare quantities of different categories of material that are somehow equivalent. There are two types of ratios used in paleoethnobotany: (1) those in which the material represented by the numerator is included in the denominator, such as density measures, percentages, and proportions, and (2) comparison ratios, in which the numerator and denominator are mutually exclusive (Miller 1988:72).

One of the most basic ratios paleoethnobotanists use is *density*, where the denominator is the total volume of the soil sample from which the plant remains were extracted (Miller 1988:

Table 3. Combined Features for Ubiquity Measures.

	BCL#	Context	Zone	Depth (cmbd)
Combined as Feature 132 Zone B	07-340	F132 N1/2	B	15-74
	07-358	F132 S1/2	B	15-80
	07-359	F132 S1/2	B	15-60
Combined as Feature 122 Zone B	07-346	F122	B	66-82
	07-362	F122 S1/2	B	82-94

73). Density ratios can express the count or weight of seeds, nuts, or wood per liter of soil to observe how the density of charred material per liter of soil may have changed through time (Pearsall 2000:196). The assumption in density ratios is that larger sediment samples have more plant remains (Miller 1988:73). Density ratios depend on consistent preservation conditions from one sample to the next, and may not be suitable for certain types of analyses (Pearsall 2000:199). Density ratios can also reveal inconsistent preservation conditions since plant remains in older deposits may not preserve as well as those in more recent deposits. If only charred plant remains are preserved at a site, density ratios can be used to compare the amount of burning activity between contexts or features (Pearsall 2000:196). I use density ratios to compare the plant remains in the Pisgah phase features from Smokemont. Density ratios would not be appropriate for the Connestee phase samples, however, because some of the zones were dry-screened.

Unlike density measures, the numerator and denominator of *proportions* and *percentages* must be expressed in the same unit of measurement. Percentages and proportions are useful for detecting replacement of one category of material by another through time or along a geographic cline, or to assess variability between samples due to circumstances of preservation (Miller 1988:74). Percentages standardize the different quantities of material per sample, regardless of the cause of uneven density. Interpreting percentages of seed taxa can be difficult due to differential preservation and the likelihood of deposition. Because percentages are relative measurements of abundance, it is impossible to determine which taxa are changing and which only appear to be changing because all must add up to 100 percent (Pearsall 2000:196). Because of some of the issues with proportions and percentages, they are not be used in this analysis.

Relative amounts of mutually exclusive variables are used in comparison ratios (Miller 1988:75). The numerator and denominator are not required to be expressed in the same unit of measurement in this type of ratio (Miller 1988:76). Comparison ratios can be used to compare quantities of two different taxa or two material categories to either demonstrate that one has replaced the other through time or space, or to control for likelihood of preservation (Pearsall 2000:201). By using wood charcoal to represent deliberate burning activities as the denominator in a comparison ratio, patterns of burned taxa should reflect their relative importance (Pearsall 2000:203). A problem with comparison ratios is that it may be difficult to determine which categories taxa belong to; for example, nutshell could be interpreted as food or fuel (Pearsall 2000:204). Comparison ratios may be useful when analyzing carefully categorized taxa that have similar uses (e.g. food-food, fuel-fuel) and similar avenues of preservation (Pearsall 2000:206). I use comparison ratios when comparing features within the Connestee phase, within the Late Qualla phase house, and between the Pisgah and Qualla phase hearths.

Visual representations of paleoethnobotanical data in pie charts, stem-and-leaf plots, histograms, and boxplots can be useful for seeing patterns in the data, comparing samples from different contexts, as well as to display the results of quantitative analyses. In their analysis, Lennstrom and Hastrof (1995:704) converted percentages into pie charts to compare samples from different contexts when non-parametric statistical analyses did not produce useful results. Although the use of visual aids cannot replace more rigorous statistical techniques, Lennstrom and Hastrof (1995) found them useful for quickly locating features that warranted further quantitative investigation. Stem-and-leaf plots and histograms can be useful for quickly assessing the overall distribution in the data. I use histograms in my analysis of Smokemont for this purpose as well. Margaret Scarry used boxplots in her analysis of plant remains from Moundville to illustrate the "changes over time in the relative abundance of remains from the dominant resources" (Scarry 1993:163). Stacked boxplots depicting data for a taxon in different contexts can be used to compare their distributions (Scarry 1993:163). I use boxplots to compare distributions of grouped taxa (such as "nuts") between features.

Kadane (1988:207) suggests using a Poisson distribution to predict expected seed counts per volume of soil. The assumption is that plant taxa are evenly distributed in the soil (Kadane 1988:207). One of the problems with this method is that the outliers in a Poisson distribution would be considered statistically insignificant, while anthropologically rarely occurring taxa may be very meaningful (Ford 1988:216). Because I use density ratios in a similar manner, I found it unnecessary to use a Poisson distribution.

Diversity summarizes data to describe the composition of a plant assemblage (Popper 1988:66). The Shannon-Weaver diversity index is commonly used in paleoethnobotany to incorporate the total number of taxa and the relative abundance of each taxon to predict what a randomly selected plant remain will be within a dataset (Popper 1988:66). If there are many taxa evenly distributed in an assemblage, the certainty of correctly predicting the identity of the selected plant is low, indicating high diversity, and if the taxa are few and unevenly distributed, the index indicates low diversity (Popper 1988:66). The Shannon-Weaver diversity index may be useful for measuring the stability of resource use over time (Pearsall 2000:211). Although the Shannon-Weaver diversity index may be useful for identifying distributions in large datasets, I did not see a need for it when analyzing the Smokemont samples.

When quantifying plant data, approaches that require more rigor than the data are capable of sustaining should not be used (Pearsall 2000:193). After carefully considering the range of quantitative analytical methods that have been used on paleoethnobotanical data, only the methods that produce useful and significant results will be used on the samples from Smokemont. When comparing plant remains from Smokemont to those found at other sites, care must be taken to ensure that the results do not lead to inaccurate interpretations. Although direct comparisons are not possible due to differences such as preservation and recovery techniques, qualitative comparisons are made between the sites to develop a better understanding of plant use across the Appalachian Summit.

Chapter 3

Results and Discussion

I begin analyzing the archaeobotanical data at Smokemont by looking at the samples within Connestee, Pisgah, and Late Qualla phase contexts to determine if there are differences at Smokemont between the features within each time period. Then, I compare hearths from Structures 1 and 2, looking at differences in hearth makeup between the two time periods. Finally, archaeobotanical data from the samples at Smokemont are qualitatively compared to those from nearby sites to see if plant uses at Smokemont reflect general trends across the Appalachian Mountains. Due to differential preservations at other sites, and various methods of sample collection, processing, and analysis, direct quantitative comparisons between samples from Smokemont and other archaeological sites may yield misleading results and are not attempted here.

For this analysis, samples from the same feature and zone (such as those that were bisected) are considered together to prevent artificially inflating the data. All comparative forms (those labeled “cf.”), unidentified/unidentifiable plant remains, and pitch, while available in the counts and weights provided in Table 4 and Appendix A, are discussed, but excluded from quantitative analyses and bar graphs. Pitch refers to vitrified material in which the sugars/starches within the plant part have burned to the point that the piece has become glassy. Pitch is unidentifiable because it does not have enough of a structure remaining to determine what type of plant it came from, whether it is wood, corn, a seed, etc. Since it is unidentifiable and there tends to be a significant amount of pitch in most of the Smokemont samples, it is not considered for analyses and graphs.

Table 4 presents all of the plant remains recovered from Smokemont. The Smokemont samples provided a total of 84.00 g of non-wood plant material, and 253.30 g of wood. These samples contain around 6,700 specimens representing 63 different plant taxa. The taxonomic name and seasonality (when applicable) for each taxon are provided. The three time periods represented at Smokemont (Connestee, Pisgah, and Qualla) are listed in columns side-by-side for easy comparison. For a list of the archaeobotanical remains that came from each sample, see Appendix A.

Connestee Phase

Archaeobotanical remains from two Connestee phase pits, Features 122 and 132, were analyzed for this research. The Feature 122 samples represent three separate zones, Zones A, D, and E, and Feature 132 is composed of two zones, Zones A and B. Sample volumes range from 10 to 127 liters, and reflect both flotation samples and dry-screening done on site (Table 2). Because some of the samples from Features 122 and 132 were dry-screened (6.4-mm mesh), density ratios (plant:sample volume) are not used to standardize any of the data from the Connestee phase. Instead, I use comparison ratios to compare counts of grouped taxa/plant materials to total plant weight. I then use the comparison ratios to look at how each pit was used, and to compare the two pits to one another.

Feature 122

Only the south half of Feature 122 was excavated in 2010 (Angst 2013:39). Feature 122 was 72 cm deep (33 to 105 cm below datum [cmbd]), and the entire pit measured 80 to 90 cm

Table 4. Archaeobotanical Remains from Smokemont (31Sw393.

Taxon:			Connestee (N=8)		Pisgah (N=4)		Late Qualla (N=9)	
Common Name	Taxonomic Name	Seasonality	Count	Weight (g)	Count	Weight (g)	Count	Weight (g)
Acorn	*Quercus* sp.	Fall	1	0.00	27	0.04	27	0.04
Acorn cap	*Quercus* sp.	Fall			1	0.00		
Acorn cap cf.	*Quercus* sp. cf.	Fall	1	0.01	2	0.00		
Acorn cf.	*Quercus* sp. cf.	Fall	3	0.01	5	0.00		
Acorn meat	*Quercus* sp.	Fall	2	0.11			2	0.00
Acorn meat cf.	*Quercus* sp. cf.	Fall			6	0.02	2	0.00
Acorn/chestnut shell	*Quercus/Castanea*	Fall					10	0.00
Aster family cf.	Asteraceae cf.				5	0.00	5	0.00
Aster seed head	Asteraceae				2	0.00		
Bark			55	0.32	73	0.58	104	1.02
Bark/stem					23	0.06		
Bean	*Phaseolus vulgaris*	late summer/fall					1	0.01
Bean cf.	*Phaseolus vulgaris* cf.	late summer/fall					4	0.01
Bean/persimmon cf.	*Phaseolus/Diospyros* cf.						1	0.00
Bearsfoot	*Smallanthus uvedalius*	summer/fall			32	0.00		
Bedstraw	*Galium* sp.				6	0.01	3	0.00
Bedstraw cf.	*Galium* sp. cf.				1	0.00	8	0.00
Beech	Fagaceae						1	0.00
Black walnut	*Juglans nigra*	Fall	304	7.28	22	0.15	15	0.21
Black walnut cf.	*Juglans nigra* cf.	Fall			1	0.00		
Blackberry/raspberry	*Rubus* sp.	summer			42	0.01		
Blackberry/raspberry cf.	*Rubus* sp. cf.	Summer			1	0.00		
Bud					8	0.01	2	0.00
Cane	*Arundinaria* sp.		144	1.06	143	0.98	1	0.00

Table 4. Continued.

Taxon:			**Connestee (N=8)**		**Pisgah (N=4)**		**Late Qualla (N=9)**	
Cane cf.	*Arundinaria* sp. cf.		1	0.00	7	0.00		
Catkin/stem					11	0.10		
Chenopod	*Chenopodium berlandieri*	late summer/fall	2	0.00	8	0.00	5	0.00
Chenopod perisperm	*Chenopodium berlandieri*	late summer/fall			83	0.03		
Chestnut	*Castanea dentate*	Fall			1	0.00		
Chestnut cf.	*Castanea dentata* cf.	Fall					2	0.00
Chestnut meat	*Castanea dentata*	Fall	563	16.70				
Chestnut meat cf.	*Castanea dentata* cf.	Fall	388	3.22				
Chestnut meat, part. carbonized	*Castanea dentata*	Fall	1	0.01				
Chestnut shell	*Castanea dentata*	Fall	798	2.52				
Chestnut shell cf.	*Castanea dentata* cf.	Fall	15	0.04				
Corn cupule	*Zea mays*	late summer/fall			13	0.05	31	0.12
Corn cupule cf.	*Zea mays* cf.	late summer/fall			10	0.02	9	0.00
Corn glume	*Zea mays*	late summer/fall			1	0.00	4	0.00
Corn glume cf.	*Zea mays* cf.	late summer/fall	1	0.00				
Corn kernel	*Zea mays*	late summer/fall			19	0.06	14	0.05
Corn kernel cf.	*Zea mays* cf.	late summer/fall			2	0.00	9	0.01
Cucurbit rind	Cucurbitaceae	late summer/fall	21	0.13			12	0.04
Cucurbit rind cf.	Cucurbitaceae cf.	late summer/fall			1	0.00		
Five-lobed seed					6	0.00	2	0.00
Five-lobed seed top					1	0.00		
Gall					16	0.00	9	0.01
Grape	*Vitis* sp.	Summer			5	0.00		
Grape cf.	*Vitis* sp. cf.	Summer			2	0.00		
Grass family	Poaceae				5	0.00	2	0.00
Grass family cf.	Poaceae cf.				2	0.00		

Table 4. Continued.

Taxon:			Connestee (N=8)		Pisgah (N=4)		Late Qualla (N=9)	
Hawthorn cf.	*Crataegus* sp. cf.	summer/fall					1	0.00
Hazelnut	*Corylus* sp.	Fall	13	0.06	6	0.01		
Hickory	*Carya* sp.	Fall	132	2.02	167	2.85	31	0.15
Hickory cf.	*Carya* sp. cf.	Fall			13	0.03	3	0.00
Hickory husk cf.	*Carya* sp. cf.	Fall	1	0.02				
Hickory, part.carbonized	*Carya* sp.	Fall					8	0.00
Holly cf.	*Ilex* sp. cf.						1	0.00
Honey locust	*Gleditsia triacanthos*		1	0.00				
Insect body							1	0.00
Knotweed	*Polygonum* sp.				1	0.00		
Legume cf.	Fabaceae cf.		1	0.00	2	0.00		
Maygrass	*Phalaris caroliniana*	spring/early summer			1	0.00		
Maygrass cf.	*Phalaris caroliniana* cf.	spring/early summer			1	0.00		
Maypop	*Passiflora incarnata*	Summer			1	0.00	1	0.00
Monocot stem	Poaceae						5	0.04
Node			1	0.01	11	0.02		
Node cf.			1	0.00				
Node/stem			22	0.18				
Nutmeat cf.			206	0.96				
Nutmeat, unidentified			7	0.02				
Nutshell			13	0.09	3	0.00	1	0.00
Nutshell cf.							3	0.00
Nutshell, unidentified			1	0.00				
Oily seed							4	0.00
Peach	*Prunus persica*	Summer					8	0.10
Peach cf.	*Prunus persica* cf.	Summer					1	0.00
Peach/black walnut	*Prunus/Juglans*						39	0.22

Table 4. Continued.

Taxon:			Connestee (N=8)		Pisgah (N=4)		Late Qualla (N=9)	
Peach/black walnut cf.	*Prunus/Juglans* cf.						11	0.04
Peduncle/stem					4	0.01		
Persimmon cf.	*Diospyros virginiana* cf.	Fall			1	0.00	1	0.00
Persimmon fruit cf.	*Diospyros virginiana* cf.	Fall					2	0.01
Persimmon seed	*Diospyros virginiana*	Fall					1	0.00
Persimmon seed cf.	*Diospyros virginiana* cf.	Fall	1	0.00	3	0.00	1	0.00
Persimmon seed coat	*Diospyros virginiana*	Fall			1	0.00	1	0.00
Persimmon seed coat cf.	*Diospyros virginiana* cf.	Fall			1	0.00		
Pine family cone	Pinaceae		55	0.16	29	0.08	6	0.00
Pine cone/bark					93	0.32		
Pine needle base	*Pinus sp.*				1	0.00		
Pitch	Vitrification		253	31.24	84	0.47	1192	6.00
Plum/cherry cf.	*Prunus* sp. cf.	Summer					4	0.00
Pokeweed	*Phytolacca americana*	summer/fall			191	0.06		
Pokeweed cf.	*Phytolacca americana* cf.	summer/fall			2	0.00		
Purslane	*Portulaca* sp.	summer/fall					6	0.00
Ragweed	*Ambrosia* sp.						6	0.00
Ragweed cf.	*Ambrosia* sp. cf.				2	0.00	1	0.00
Sedge family cf.	Cyperaceae cf.				1	0.00		
Spore clump					1	0.00		
St. Johnswort cf	*Hypericum* sp. cf.						1	0.00
Stem			3	0.02	40	0.21	1	0.01
Sumpweed	*Iva annua*	late summer/fall	2	0.00				
Sunflower cf.	*Helianthus annuus* cf.	late summer/fall			1	0.00		
Thin hickory	*Carya* sp.	Fall					2	0.01
Thorn					1	0.00		
Tiny seed							38	0.00

Table 4. Continued.

Taxon:			**Connestee (N=8)**		**Pisgah (N=4)**		**Late Qualla (N=9)**	
Tobacco	*Nicotiana* sp.				1	0.00		
Triangular seed							1	0.00
Tulip tree	*Liriodendron tulipfera*	spring/early summer					1	0.00
Tulip tree cf.	*Liriodendron tulipfera* cf.	spring/early summer			1	0.00		
Unidentifiable			124	0.43	52	0.14	96	0.15
Unidentifiable seed					84	0.03	44	0.02
Unidentifiable seed coat							2	0.00
Unidentifiable seed fragments					8	0.00		
Unidentified - fruit seed?			1	1.01				
Unidentified (circular)					3	0.00		
Unidentified fruit seed			1	0.02				
Unidentified nutshell			22	0.22	3	0.00		
Unidentified nutshell/seed							1	0.00
Unidentified seed			1	0.00			11	0.02
Unidentified seed a					1	0.00	5	0.00
Unidentified seed b					1	0.00	5	0.00
Unidentified seed c					12	0.00	3	0.00
Unidentified seed d							47	0.01
Unidentified seed coat							8	0.01
Unidentified seed coat cf.							1	0.00
Unidentified seed coat/nutshell			1	0.00				
Unidentified starchy seed			3	0.00				
Unidentified thick seed					7	0.01		
Walnut family	Juglandaceae	Fall	146	1.14	12	0.12	58	0.11
Wood				41.20				
Wood, partially carbonized			20	0.09	4	0.01		1.75
Wood/cane, part carbonized					12	0.06		

wide at the top (Angst 2013:39). Five zones were identified in Feature 122 (A, B, C, D, and E), but flotation samples were only collected from Zones B, D, and E. Feature 122 has a radiocarbon date of A.D. 527 ± 74. Figure 14 indicates the amount of plant remains recovered from Feature 122.

In the earliest zone, Zone E (103-105 cmbd), only miscellaneous taxa and nuts were present (Table 5). Nuts in Zone E include black walnut, chestnut meats and shells, and hickory. Miscellaneous taxa, composed of bark, cane, and pine cone, make up the majority of the plant remains from Zone E. No other artifacts were found in this zone, but notably Zone E contained five times more miscellaneous taxa than Zone B near the top of the pit. I believe that the bark, cane, and pine cone found in Zone E may have been placed in the bottom of the pit as a lining before it was used as a storage pit, possibly to store nuts. Another theory is that these materials may have been used as tinder to start a low-intensity fire in the bottom of the pit before it was used for cooking.

Zone D (98-101 cmbd) had the least amount of archaeobotanical material, with a total plant weight of 3.01g. Besides a little bit of pitch, two chestnut meats came from Zone D. I believe it is important to note that the Zone D sample (17 liters of soil) was dry-screened through a 0.25-inch screen, which certainly caused the loss of some smaller plant remains. Artifacts in Zone D included a mix of fire-cracked rock, charcoal, a quartz hammerstone, and pottery (Angst 2013: 39). Several large sherds from Zone D refitted with sherds in Zone B (Angst 2013:39). Above Zone D, Zone C (94-98 cmbd) was composed of a dense layer of fire-cracked rock (FCR) with some charcoal scattered throughout (Angst 2013:39). Due to the density of FCR, a flotation

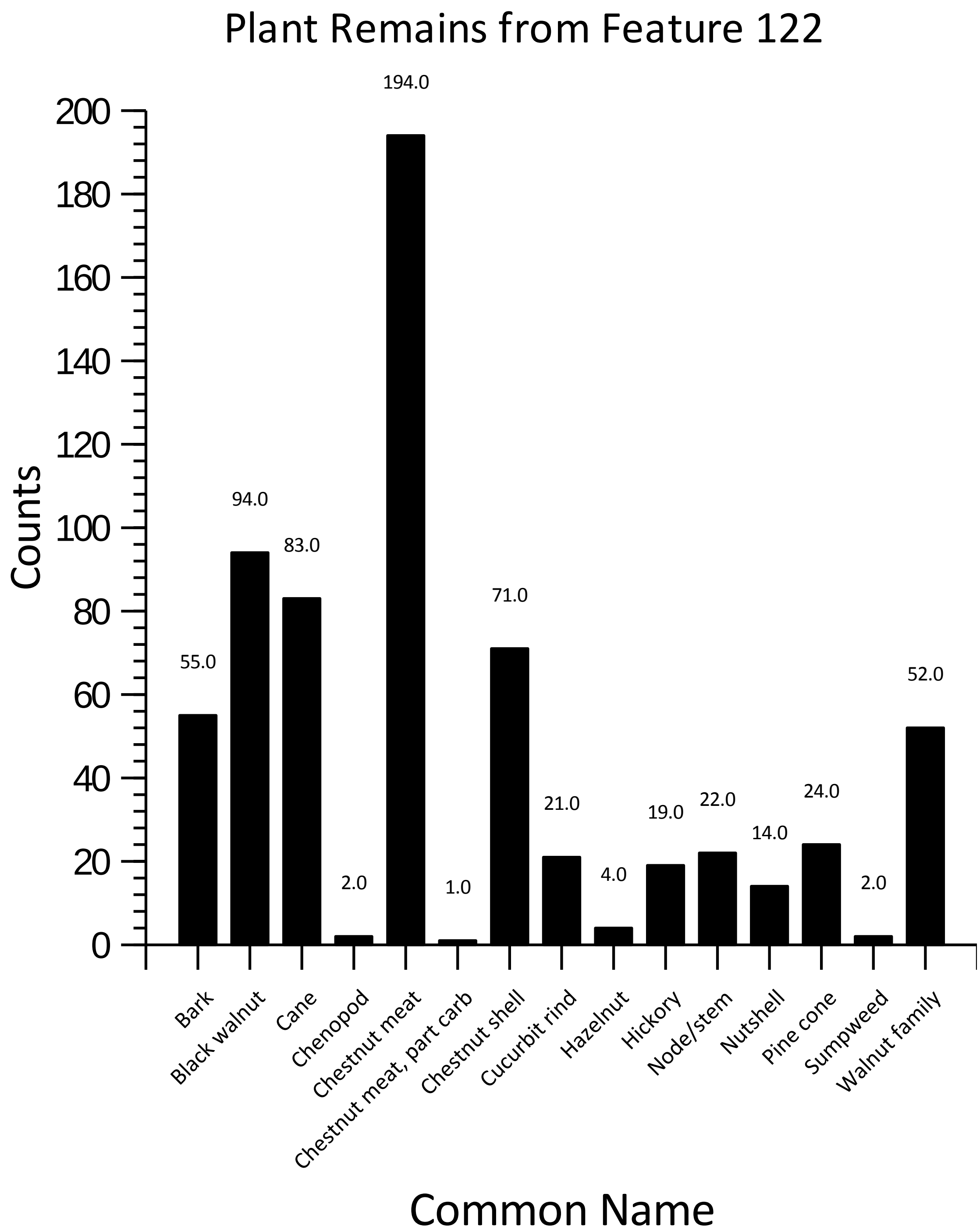

Figure 14. Plant remains from Feature 122.

Table 5. Feature 122 Comparison Ratios between Zones B, D, and E.

Zone	Grouped Taxa : Total Plant Weight	Count/Weight (g)	Value
B	Miscellaneous	82 : 140.8	0.58
B	Native cultigen	25 : 140.8	0.18
B	Nut	493 : 140.8	3.50
D	Nut	2 : 3.01	0.66
E	Miscellaneous	102 : 36.13	2.82
E	Nut	19 : 36.13	0.53

sample was not collected from Zone C, and there were no non-wood plant remains were recovered from Zone C. Zone D may have been trash and fill placed or thrown into the pit after its primary use as a storage pit. Alternatively, Zone D could have been intentionally placed in the pit to create an even surface to deposit the fire-cracked rock in Zone C, then wood logs in Zone B.

Zone B (15-80 cmbd) was the latest zone from which a flotation sample was taken, and contained a large amount of nuts and charred logs. Zone B had five times more nuts than Zone D, and seven times more than Zone E. Chestnut meats and shells were the most common, together representing 250 of the nuts in this zone. There were also a significant number of black walnuts (n=89) in this zone. Although not as numerous as chestnut and black walnut, Zone B also contained hickory and hazelnuts. A small amount of acorn was also tentatively identified from Zone B. Native cultigens were found only in Zone B, and included chenopod, cucurbit rind, and sumpweed. Tentatively identified legume and persimmon seed are also present in this sample. Miscellaneous taxa in Zone B were similar to Zone E, and included bark, cane, node/stem, and pine cone. However, there was much less of this material in Zone B. Other artifacts in Zone B include charred logs, some large ceramic sherds and a small amount of debitage (Angst 2013:39).

In Feature 122, the three zones have similar taxa throughout, although in different quantities (Table 5). The pit appears to have preserved well, given that partially carbonized wood is present in Zones B and E, and partially carbonized chestnut meats in Zone E. Generally dense hickory shell preserves better than most other plant remains, but hickory was outnumbered by black walnut and chestnut in this sample in all zones.

Whatever the reason for these deposits, Zones D, C, and B may have been deposited in the pit around the same time. As the logs in Zone B burned, pottery and chestnut meats from Zone B may have fallen through the layer of fire-cracked rock, settling at the bottom of the pit in Zones D and perhaps Zone E, or perhaps pieces of a large broken pot were tossed into the pit both before and after it was used as a cooking pit. Zone E may possibly be made up of the smaller materials that fell through Zones C and D and accumulated at the bottom of the pit. The bark, cane, and pine cone from Zone E could have been tinder placed at the bottom of the pit to start the fire used for cooking. Zone E could have also been a lining of bark, cane, and pine cone placed in the bottom of the pit before it was used for nut storage.

Feature 132

Feature 132 was a large, cylindrical pit 77 cm deep (3-80 cmbd), and around 65 cm across (Angst 2013:41). The feature was divided into two zones, Zones A and B. Artifacts from the feature included pottery, debitage, fire-cracked rock, and charred material (Angst 2013:41). Feature 132 has a radiocarbon date of A.D. 442 ± 82 (Figure 15).

Zone B (15-80 cmbd) had a surprisingly robust assemblage of nuts, particularly chestnut. Zone B contained eighteen times more nuts than Zone A. There were 727 chestnut shells and 359 chestnut meats in Zone B. Black walnut was also common in this zone, with 209 shells identified. Comparatively, there were only 113 hickory shells in Zone B. Generally, thick hickory shells tend to preserve well in archaeobotanical samples, while thinner, more delicate shells like chestnut and acorn do not. One tentatively identified corn glume was present in this sample.

Walnut family, acorn, and hazelnut were also identified. Acorn and hazelnut were not represented as well as chestnut. Generally, the absence of these nuts in an archaeobotanical sample may be due to differential preservation, with thicker-shelled hickory being overrepresented. However, because chestnut, another delicate nutshell, was so numerous in Feature 132, it seems unlikely that acorn and hazelnut were not represented due to issues of preservation. It is possible that acorns were processed elsewhere in another pit that was not uncovered in these excavations. Acorns may not have been used in these pits at all, possibly because acorn yields were poor when these pits were in use.

Zone B also contained one honey locust seed, and some miscellaneous taxa. The miscellaneous taxa consist primarily of cane and pine cone. Given the similarity of these taxa to those at the bottom of Feature 122, these plant remains may also represent a lining or tinder placed in the pit before its use.

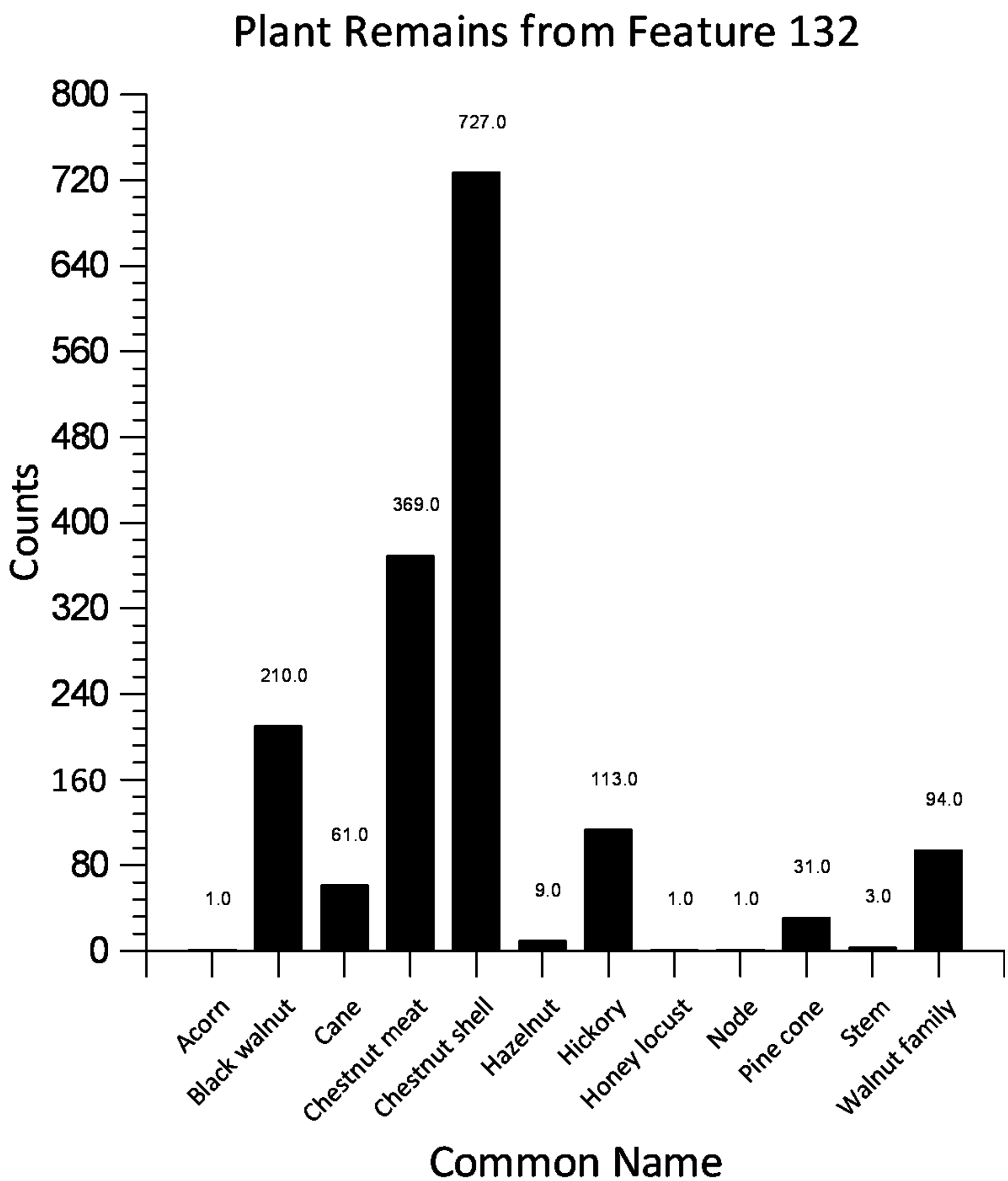

Figure 15. Plant remains from Feature 132.

The relatively few plant remains that came from Zone A (3-20 cmbd) were nuts (Table 6). Chestnut meats and one black walnut fragment were present in this zone. It should also be noted, however, that the Zone A sample (23 liters) was dry-screened through a 0.25-inch mesh rather than processed through flotation. For this reason, small plant remains are underrepresented in this zone. Zone A may have had few plant remains to begin with, and may be post-depositional fill.

In Feature 132, Zone B is particularly interesting given the high quantity of chestnut and black walnut present. There are large quantities of both chestnut shell and meats, suggesting that this pit was used either to store nuts, or as a discard pit during food processing. Interestingly, no native cultigens were found in Feature 132.

Discussion

Both Connestee phase features have large amounts of nuts in them. Chestnut meats and shells and black walnut are found in relatively high numbers in both features. When the raw counts of nuts in the two pits are compared, it appears that there are significantly greater quantities in Feature 132. However, when the raw counts are standardized in comparison ratios and are presented in boxplots side-by-side (Figure 16), the relative amounts of nuts in each pit are very similar. Therefore, I believe both pits were used primarily for activities associated with nuts, whether they were stored or cooked in these pits, or spoiled and discarded in them. Both pits may have been lined with cane, bark, and pine cone before their use, perhaps to protect stored foods or to tinder the fire that was lit. Feature 122, which contained a layer of FCR, seems to have possibly also been used as a cooking pit, or used to discard materials used in cooking. In

Table 6. Feature 132 Comparison Ratios between Zones A and B.

Zone	Grouped Taxa : Total Plant Weight	Count/Weight (g)	Value
A	Nut	11 : 6.53g	1.68
B	Fruit	1 : 50.93g	0.01
B	Miscellaneous	96 : 50.93g	1.88
B	Nut	1,512 : 50.93g	29.69

addition to a large quantity of nuts, Feature 122 also contains native cultigens, notably chenopod, cucurbit rind, and sumpweed, which may represent foods that were spilled or discarded during cooking.

Pisgah Phase

Archaeobotanical remains have been analyzed from three features in the Pisgah house: two interior postmolds (Features 151 and 157) and the central hearth (Feature 93). The soil sample volumes were 37 liters for Feature 151, 45 liters for Feature 157, and 11 liters for Feature 93. All of the samples from the Pisgah house were floated to retrieve plant remains. Since the plant remains from all of the Pisgah features were collected in the same manner, and preservation conditions appear to have been uniform among the samples, density ratios (plant remains:sample volume in liters) are used to standardize raw counts in these analyses.

Feature 93

Feature 93 is the central hearth of the Pisgah house (Figure 17). The hearth was plow-truncated, destroying any evidence of a clay ring that may have existed around it (Angst 2013

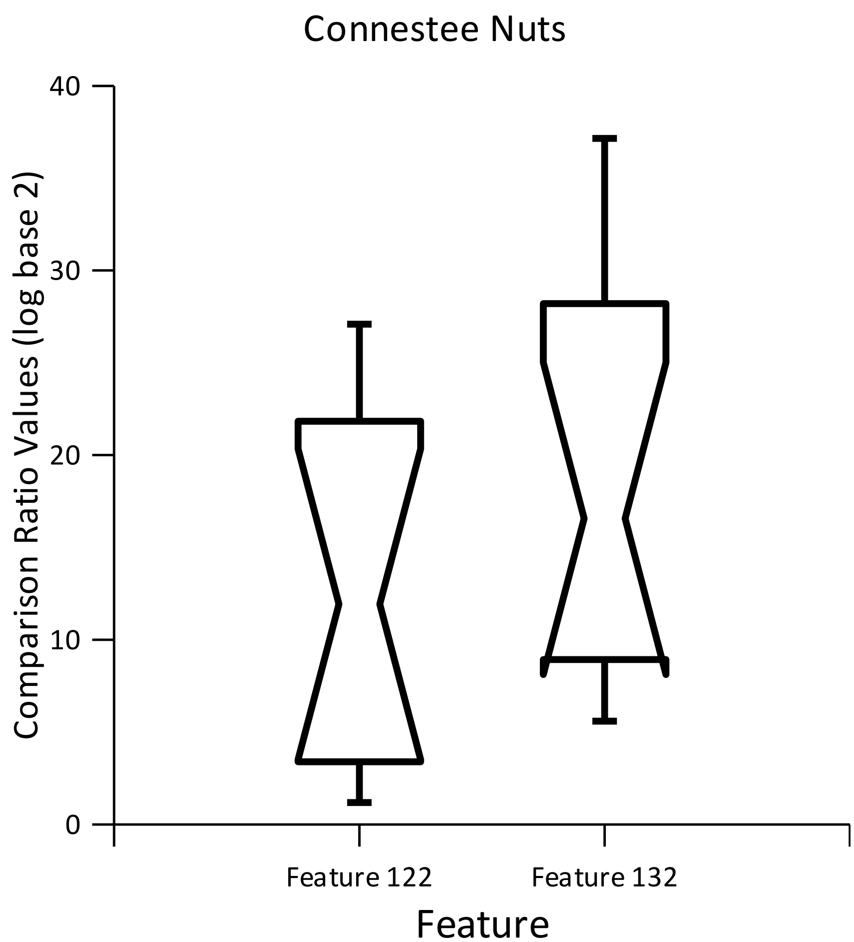

Figure 16. Comparison ratios of nuts from the Connestee features.

36). Samples taken from this feature yielded a total plant weight of 2.50 g, 1.04 g of which was wood (Figure 18). The hearth was excavated in two zones: Zone A (35-38 cmbd) and Zone B (35-39 cmbd). Both zones contain high amounts of bark, but Zone A has a wider variety of plant taxa than Zone B (Table 7). Zone B contained 0.11 g of wood, while Zone A contained 0.93 g. Figure 18 shows the amount of plant remains recovered from Feature 93.

In the earliest zone, Zone B, bark was the most common plant material found, followed by hickory, nutshell, and cane. Bark, nutshell, and cane found in this zone may have been used as tinder to start a fire. Tentatively identified black walnut shell and corn kernels are also in Zone B. More bark is found in Zone A, along with cane, pine cone, and stem. Nuts in Zone A include hazelnut shell, hickory nutshell, and walnut family nutshell, which may have been used as fuel to keep the fire kindled, and/or possibly discarded during cooking. A significant amount of corn was also present in Zone A, including one glume, three cupules, and 19 kernels. Corn cobs may have also been used to fuel the fire. The large number of corn kernels, in conjunction with other food remains, suggests that some degree of cooking may have taken place over the hearth. Bearsfoot, chenopod, and blackberry/raspberry seeds were also found in Zone A. Tentatively identified acorn meats, corn cupules, persimmon, sedge family, and sunflower are in Zone A. It is particularly interesting that missing from the plant assemblage in the Pisgah hearth are any weedy seeds, which are found in both of the postmolds.

Feature 151

Feature 151 is a central support postmold located in the southwestern quadrant of Structure 2 (Figure 19). The feature was excavated as a single provenience that was 54 cm deep (35-89 cmbd). Once floated, Feature 151 yielded 40.80 g of plant material, 36.34 g of which was wood.

There are a wide variety of plant taxa in this postmold (Figure 20; Table 8). The majority of nutshell in Feature 151 is hickory, but acorn, black walnut, chestnut, hazelnut, and walnut family are also present. Most of the fruit seeds (18) are blackberry/raspberry. Grape, maypop, and persimmon were also present in smaller numbers. Several corn cupules were recovered, but not kernels or glumes. There are a small amount of chenopod seeds, but bearsfoot is a much more common edible seed in this feature. Although bearsfoot has not been morphologically altered by human selection and is not considered an established cultigen, it has an edible seed and is in the same family as native cultigens sunflower and sumpweed. A total of 28 bearsfoot seeds came out of Feature 151. Bearsfoot is present in small amounts in the other Pisgah features, but it is more numerous in this postmold. Feature 151 also contains tentatively identified acorn, aster family, bedstraw, cucurbit rind, grape, grass family, persimmon, and tulip tree.

Among the miscellaneous taxa, I have further separated out what I refer to as “structural materials” and “weedy seeds.” I created these subcategories because they seem to be meaningful when discussing Feature 151 in the context of the other features in Structure 2. Structural materials include cane, bark, stem, and pine cone, many of which are thought to have been used to make interior floor and wall coverings, or used as roofing (Dickens 1976:34; Hill 1997:69; Williams 1930:450). Weedy seeds in Feature 151 include aster seed head, pokeweed, and five-lobed seeds. In this postmold, pokeweed is the most common, with 184 seeds identified.

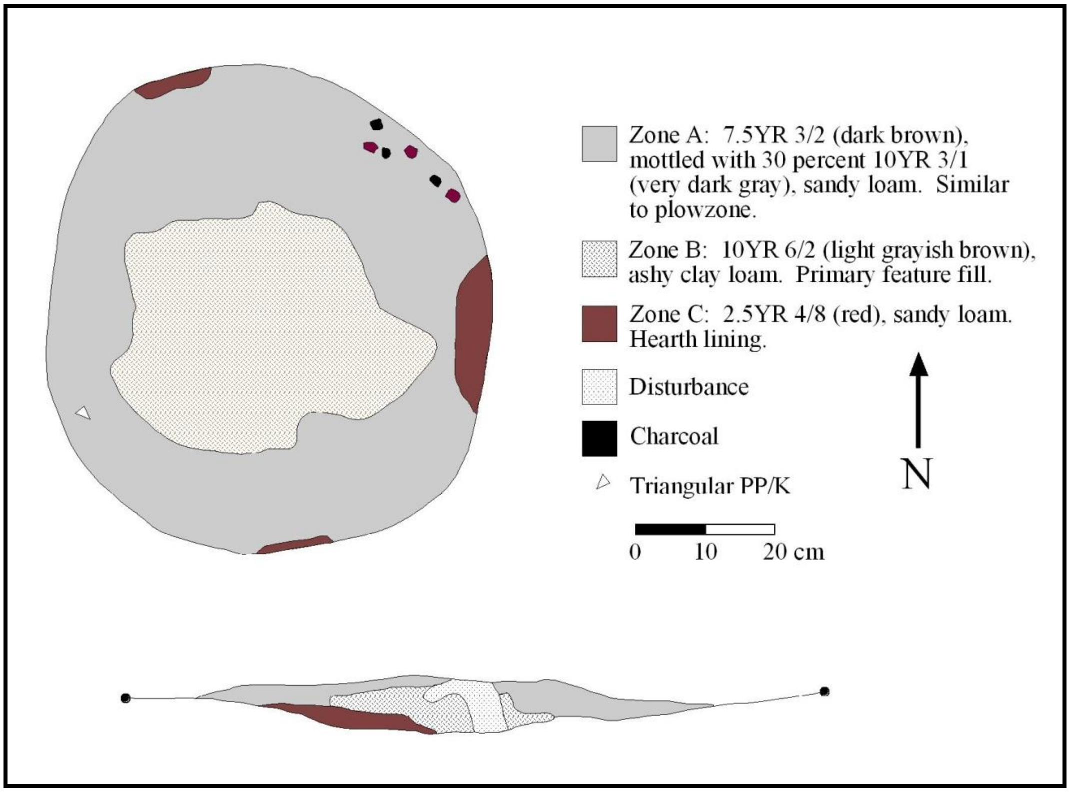

Figure 17. Diagram of Feature 93 (Angst 2013).

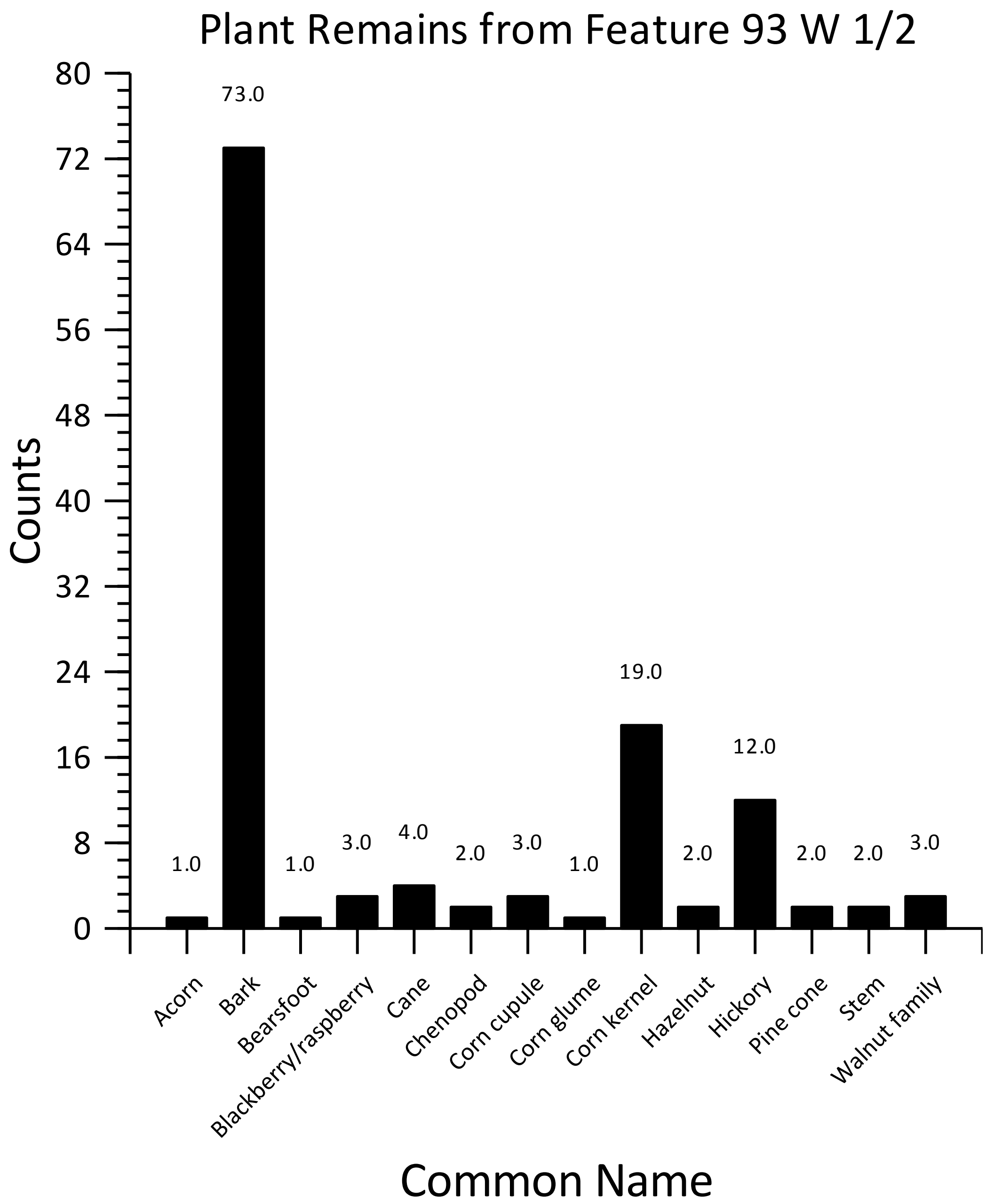

Figure 18. Plant remains from Feature 93 W1/2

Table 7. Density Ratios for Feature 93 W½.

Zone	Grouped Taxa	Count/Sample Volume (L)	Value
A	Fruit	3 : 7	0.43
A	Introduced cultigen	3 : 7	3.29
A	Miscellaneous	23 : 7	9.57
A	Native cultigen	13 : 7	0.43
A	Nut	67 : 7	1.86
B	Miscellaneous	8 : 4	7.0
B	Nut	14 : 4	2.0

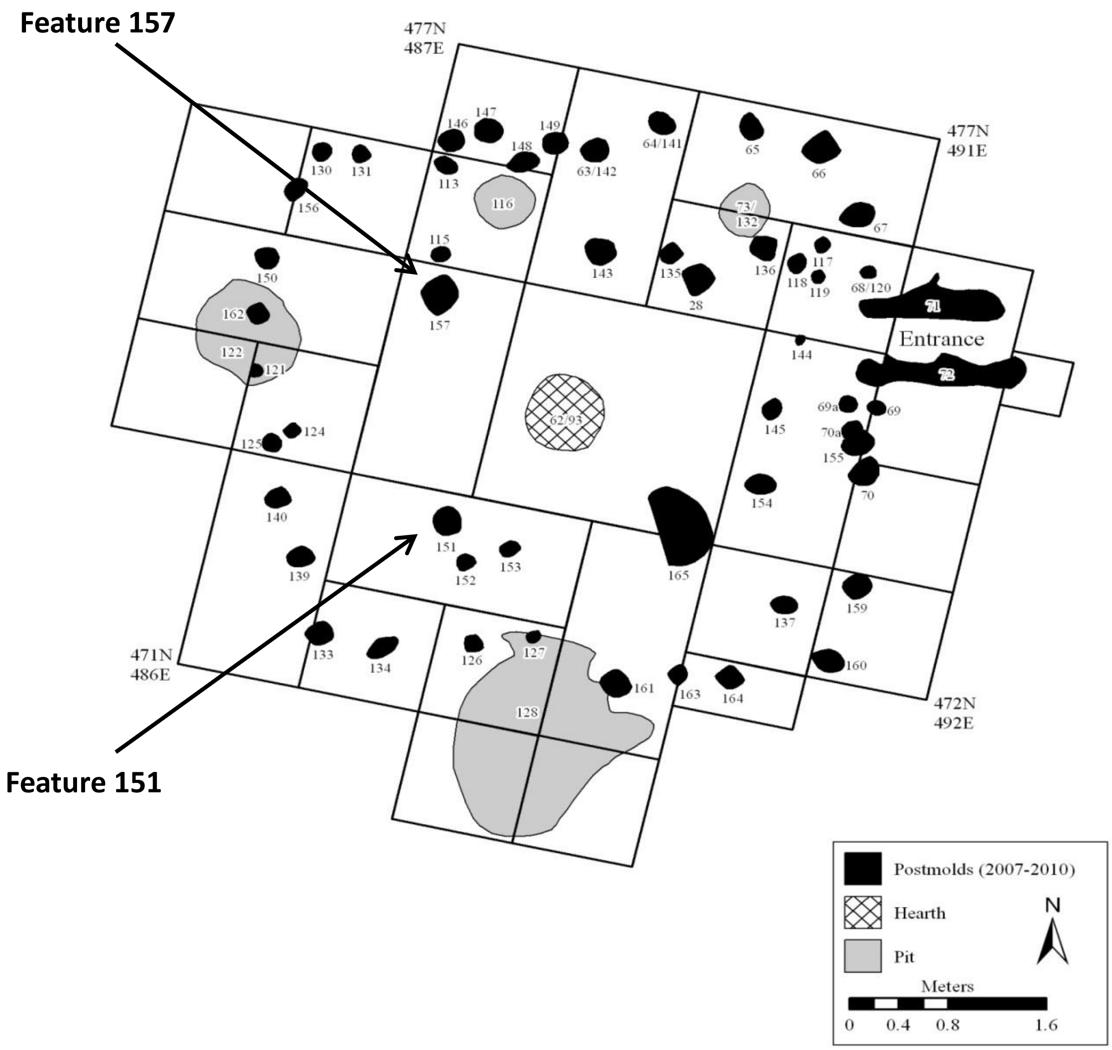

Figure 19. Location of Pisgah postmolds (Angst 2013).

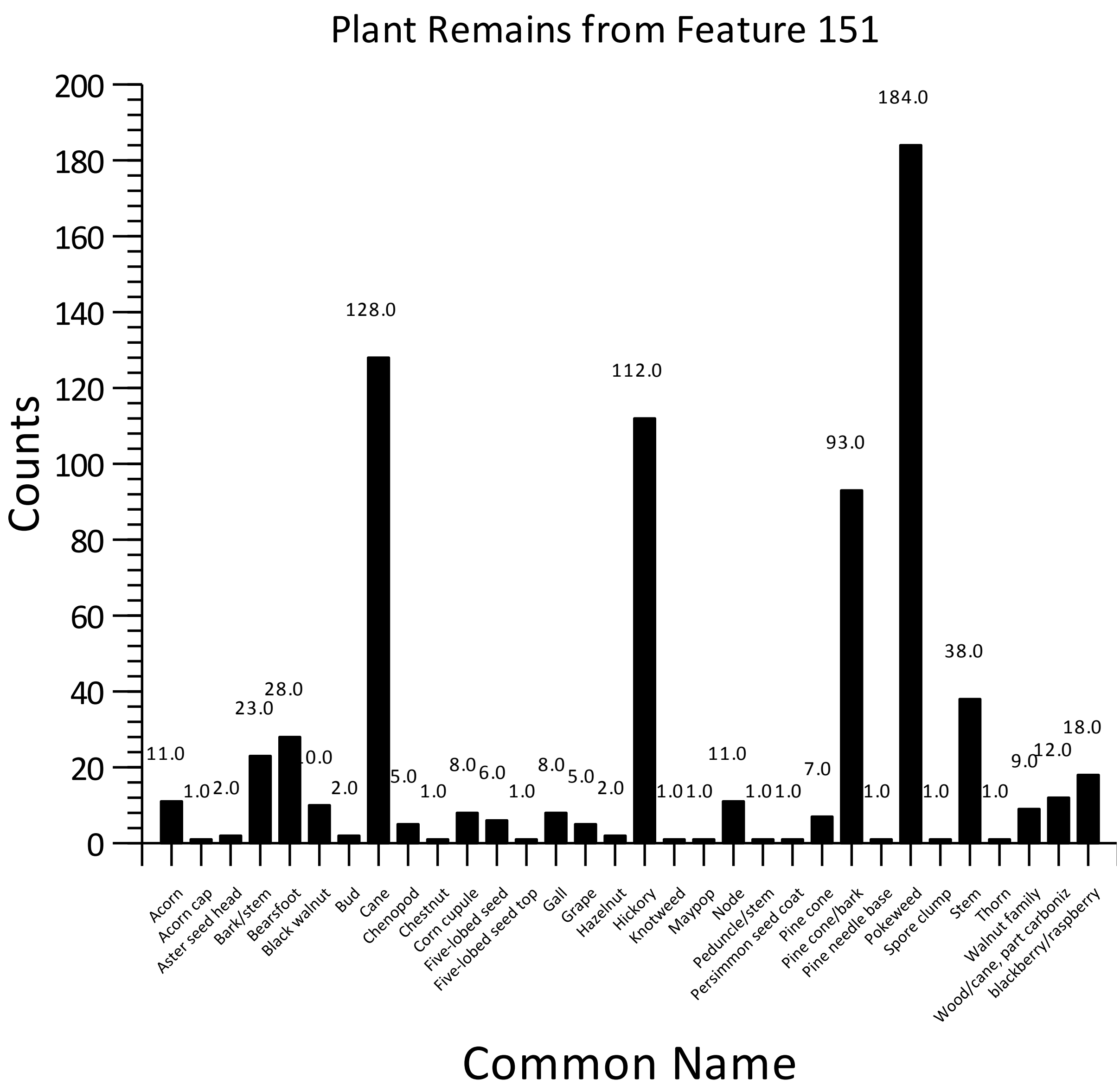

Figure 20. Plant remains from Feature 151.

Table 8. Density Ratios for Feature 151.

Grouped Taxa	Count/Sample Volume (L)	Value
Fruit	25 : 37	0.68
Introduced cultigen	8 : 37	0.22
Miscellaneous—total	507 : 37	13.70
Miscellaneous—structural materials	290 : 37	7.83
Miscellaneous—weedy seeds	193 : 37	5.22
Native cultigen	30 : 37	0.81
Nuts	146 : 37	3.95

Feature 157

Feature 157 was another central support postmold located in the northwestern quadrant of Structure 2 (Figure 19). This postmold was also excavated as one provenience, and was 71 cm deep (30-101 cmbd). A total of 16.44 g of plant material was recovered from Feature 157, 15.25 g of which was wood. The entire light fraction of Feature 157 was scanned, but the heavy fraction was subsampled; 66.45 g of the < 2.00-mm residue was not scanned, and roughly half (48.76 g) of the >2.00-mm sample was not scanned.

Nutshell was common in Feature 157, including hickory acorn, black walnut, and hazelnut (Figure 21; Table 9). Just as in Feature 151, several blackberry/raspberry seeds were present in Feature 157. There were a couple of corn cupules present, and interestingly one tobacco seed was identified. Tobacco seeds are tiny (less than 0.75 mm), so they do not commonly appear in archaeobotanical assemblages. Feature 157 contained one maygrass seed as well as two edible seeds found in the other Pisgah features, notably bearsfoot and chenopod.

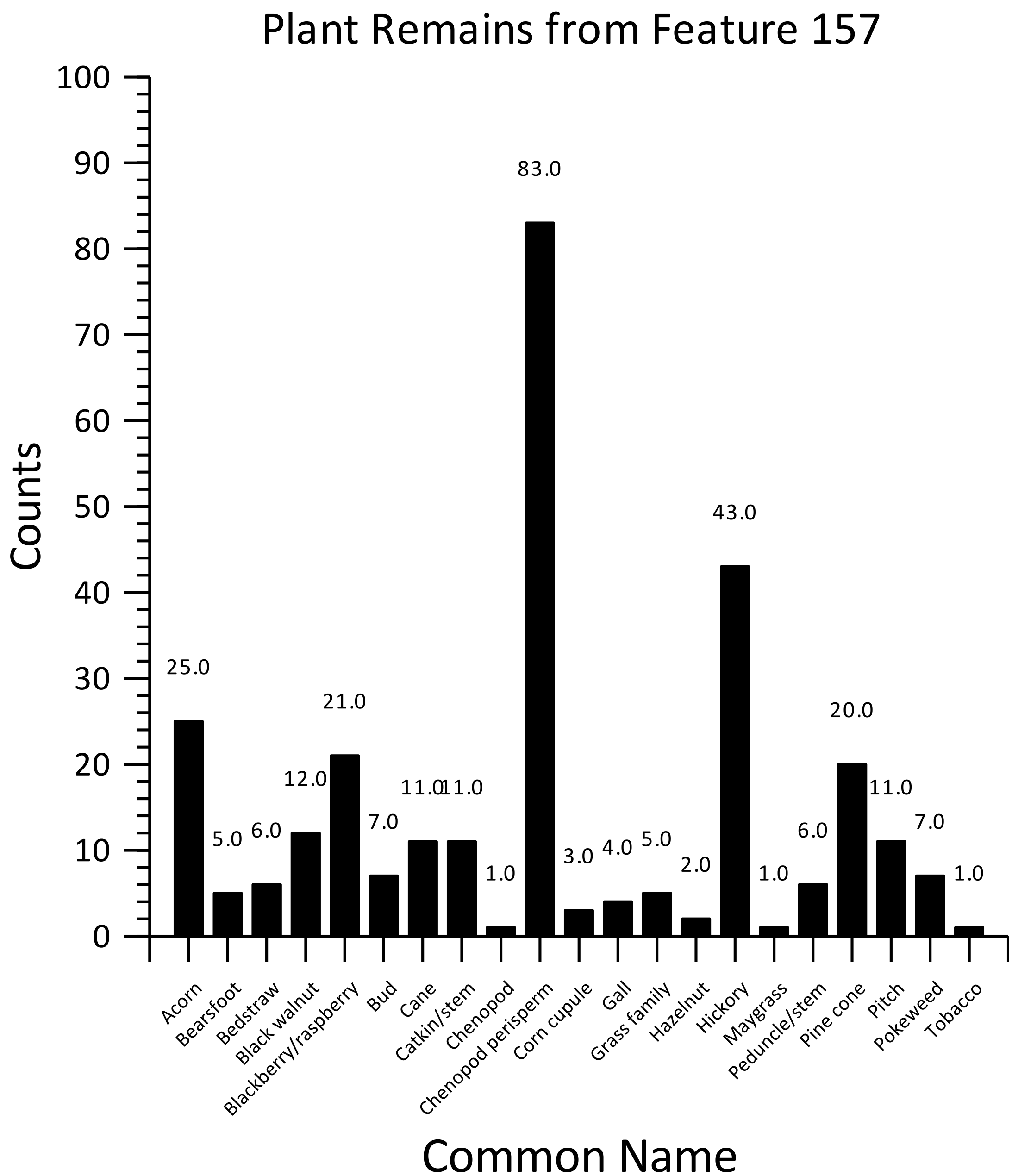

Figure 21. Plant remains from Feature 157.

Table 9. Density Ratios for Feature 157.

Grouped Taxa	Count/Sample Volume (L)	Value
Fruit	21 : 45	0.47
Introduced cultigen	3 : 45	0.07
Miscellaneous—total	77 : 45	1.71
Miscellaneous—structural materials	45 : 45	1.0
Miscellaneous—weedy seeds	18 : 45	0.4
Native cultigen	88 : 45	1.96
Nuts	72 : 45	1.60

Whereas in Feature 151 bearsfoot was more numerous than chenopod, in Feature 157 chenopod seeds were much more common than bearsfoot. A large number of chenopod perisperms (83 seeds) were uncovered in this postmold. Measurements of seed coat thickness were not taken, but their absence suggests that the seed coats were the thin, domesticated type that burn away quickly. Structural materials in Feature 157 included cane, bark, stem, and pine cone. Weedy seeds included bedstraw, grass family, and pokeweed. Tentatively identified taxa that were present in Feature 157 included acorn, aster family, blackberry/raspberry, legume, maygrass, persimmon, pokeweed, and ragweed.

Discussion

When plant remains in the postmolds are compared to the hearth, I found that most of the grouped taxa in the hearth were also in the postmolds. I created boxplots to compare the grouped taxa from the hearth to the postmolds. However, no significant differences were found. Fruits, introduced cultigens, native cultigens, and nuts are found in all the three Pisgah features (Table 10). Among fruits, blackberry/raspberry is ubiquitous in all three features, but grape, maypop, and persimmon are present in only Feature 151. Introduced native cultigens include only corn and tobacco in these samples. Corn cupules were ubiquitous in all three features, but glumes and kernels were recovered only from Feature 93. Tobacco (*Nicotiana* sp.) was only found in Feature 157. Edible bearsfoot and chenopod seeds were ubiquitous in all three features, and maygrass was found only in Feature 157. Feature 157 was the only feature with chenopod perisperms. Hazelnut, hickory, and acorn were present in all three features. Walnut family was found in both the hearth and Feature 151, and black walnut was present in both of the postmolds.

As previously mentioned, the most striking difference between the hearth and the postmolds is the lack of weedy seed taxa in the hearth. While there are no weedy seeds in the Pisgah hearth, they are abundant in the postmolds (Table 11). These seeds include aster seed head, bedstraw, five-lobed seeds, grass family, and pokeweed. These are seeds that may have blown in or traveled into the house on clothing and goods, or may have come from plants intentionally gathered and brought into the house for a variety of uses. Their absence in the hearth could indicate that the hearth and floor were swept regularly, pushing these seeds into the postmolds. If so, then it seems likely that the edible plants found in the hearth are the result of spilling during cooking or discard from other food preparation activities, and that other "trash" was swept away from these areas. This may also explain why corn cupules, the tobacco seed, and a larger range of nutshells and fruits end up in the postmolds.

Table 10. Density Ratios of Weedy Seeds from Pisgah Features.

Feature	Count/Sample Volume (L)	Value
93 W½	0	0
151	93 : 37	2.51
157	18 : 45	0.40

Table 11. Ubiquity Measures of Pisgah Phase Features.

Taxon	F. 93 W ½	F. 151	F. 157	Ubiquity
Blackberry/raspberry	X	X	X	3/3
Grape		X		1/3
Maypop		X		1/3
Persimmon		X		1/3
Corn cupule	X	X	X	3/3
Corn glume	X			1/3
Corn kernel	X			1/3
Tobacco			X	1/3
Bearsfoot	X	X	X	3/3
Chenopod	X	X	X	3/3
Chenopod perisperms			X	1/3
Maygrass			X	1/3
Hazelnut	X	X	X	3/3
Hickory	X	X	X	3/3
Walnut family	X	X		2/3
Acorn	X	X	X	3/3
Nutshell	X			1/3
Black walnut		X	X	2/3

Late Qualla Phase

Plant remains from the Late Qualla phase were collected from the floor midden and hearth from Structure 1, and four postmolds from Structure 3. The floor midden ranged in depth from 8 to 38 cm deep, and plant remains were collected in four test units (TU 5, 7, 10, and 11). Soil samples from the test units were 10 liters for each zone. The hearth (Feature 87) was 31 cm deep, and was located beneath the floor midden (Figure 22). Soil samples from the hearth totaled 33.5 liters. The postmolds from Structure 3 were 15 to 41 cm deep, and soil samples totaled 30.5 liters. Because Structure 3 is considered the summer house associated with Structure 1, the contexts of the two structures are considered to be different. Therefore, plant remains from Structure 3 will not be discussed extensively, and will only be qualitatively compared to those from Structure 1.

Feature 87

The Late Qualla hearth was excavated in eight different zones, but soil samples from only Zones C, E, and G were analyzed for plant remains. Flotation samples were taken from Zones A, D, F, H, and I, but due to time and budget constraints, only the samples that seemed they might yield the greatest quantities of plant remains were analyzed. Zone G was located around the northwest edge of the hearth (Figure 22), and Zone E was a central fill (Angst 2013:30). Zone E contained some ash, and below this zone appears to have been the remnants of a clay hearth lining (Angst 2013:30). Soil samples from the hearth varied in size, with 2.5 liters taken from Zone G, 19 liters from Zone E, and 12 liters from Zone C. Despite the differences in amounts of soil taken, the three samples each yielded a similar amount of plant and wood weight. When compared to one another, Zones E and G are mostly similar, but there are some interesting comparisons that can be made between the two zones. Zone C appears to be more similar to Zone E than Zone G.

Between the three samples, fruits, introduced New World cultigens, and native cultigens all appear in similar amounts. Peach, persimmon and one tentatively identified hawthorn seed were present in the hearth (Figure 23). Eighteen fragments in Zone G could be either peach or black walnut. Eleven more tentatively identified peach/black walnut were present in Zone C. Corn and cucurbit rind were present in all three samples. The majority of corn remains from the hearth are cupules, suggesting that corn cobs were being used as fuel. Ragweed is in both Zones E and G, and chenopod is present in Zone E.

Nuts in Zone G have a density four times higher than in Zone E, with walnut family being the most common in both samples (Table 12). Hickory is in both samples, and while acorn is present in Zone E, it has also been tentatively identified in Zone G. Miscellaneous taxa have a density three times higher in Zone G than Zone E, and both are mostly composed of bark. Weedy seeds identified in these samples include purslane and grass family. Tulip tree and tentatively identified holly are also present in the hearth.

Test Unit 5

Test Unit 5 was located along the outer edge of the floor midden, and contained the least amount of plant remains. TU 5 only had one level eight cm deep (18-26 cmbd), and contained 3.63 g of plant material, 0.71 g of which was wood. This test unit contained mostly nuts, including black walnut, hickory, and walnut family (Figure 24; Table 13). Miscellaneous

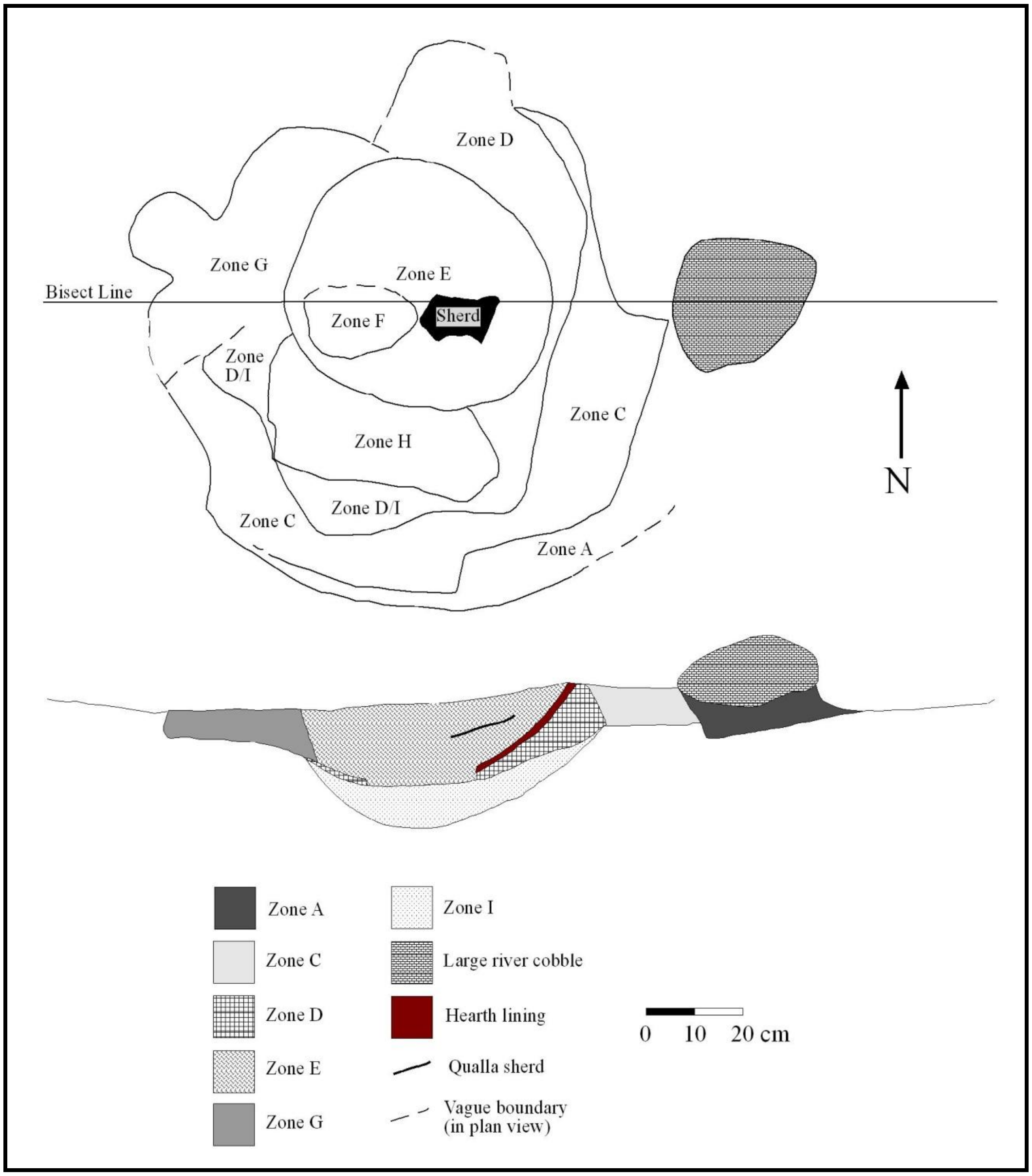

Figure 22. Diagram of Feature 87 (Angst 2013).

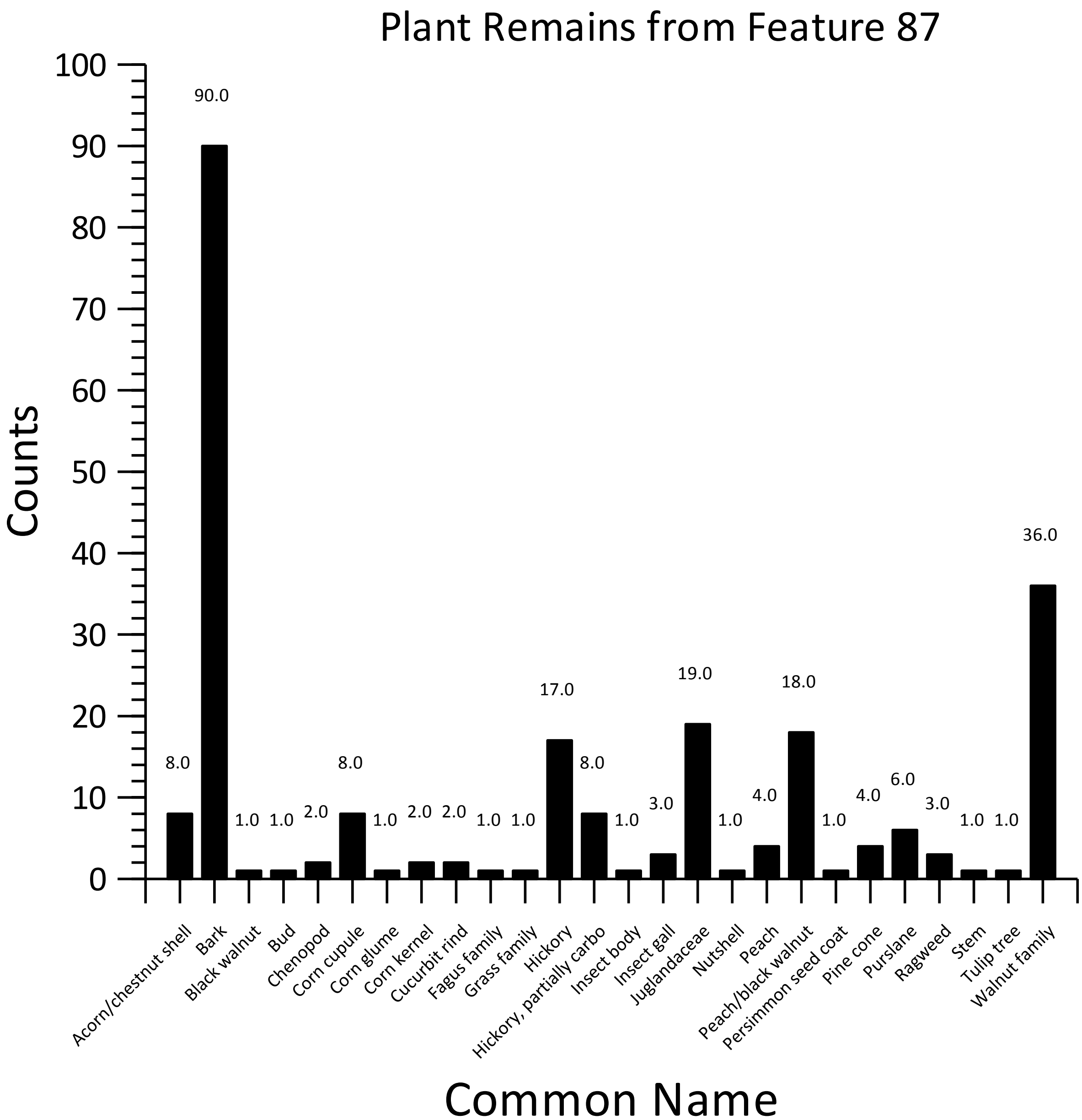

Figure 23. Plant remains from Feature 87.

Table 12. Feature 87 Density Ratios.

Zone	Grouped Taxa	Count/Sample Volume (L)	Value
N/A	Fruit	0	0
N/A	Introduced cultigen	5 : 12	0.42
N/A	Miscellaneous	11 : 12	0.92
N/A	Native cultigen	1 : 12	0.08
N/A	Nut	8 : 12	0.67
N/A	Peach/black walnut	0	0
E	Fruit	1 : 19	0.05
E	Introduced cultigen	5 : 19	0.26
E	Miscellaneous	72 : 19	3.79
E	Native cultigen	4 : 19	0.21
E	Nut	51 : 19	2.68
E	Peach/black walnut	0	0
G	Fruit	1 : 2.5	0.40
G	Introduced cultigen	1 : 2.5	0.40
G	Miscellaneous	25 : 2.5	10.0
G	Native cultigen	4 : 2.5	1.60
G	Nut	29 : 2.5	11.6
G	Peach/black walnut	18 : 2.5	7.20

taxa included a piece of bark and one unknown triangular seed. Tentatively identified aster family, bean, bean/persimmon, and bedstraw were also present in TU 5. Given its placement near the outer edge of the structure floor, it is not too surprising that TU 5 contained so few plant remains.

Test Unit 7

Test Unit 7 was located near the center of the floor midden, and was the densest test unit. TU 7 was 38 cm deep (11-49 cmbd), and composed of four zones. Soil samples from Zones A, B, and D were analyzed for archaeobotanical remains (Figure 25). A float sample was also taken from Zone C, but was not analyzed. A comparison of plant material between the zones in Test Unit 7 reveals no significant differences among Zones A, B, and D (Table 14). This is not surprising since there is "considerable overlap" between Zones A and B, and because Zone D appears to be a mixture of Zones A, B, and C (Angst 2013:26). Zone D may have been disturbed by post-depositional activities, possibly from erosion (Angst 2013:26). Density ratios of grouped taxa also reveal no significant differences between the zones, so although I will discuss them separately, I will not attempt to make comparisons between the zones in TU 7.

Table 13. Comparison Ratios of Test Unit 5 Zone A.

Grouped Taxa	Count/Plant Weight (g)	Value
Miscellaneous	2 : 3.63	0.55
Nuts	5 : 3.63	0.83

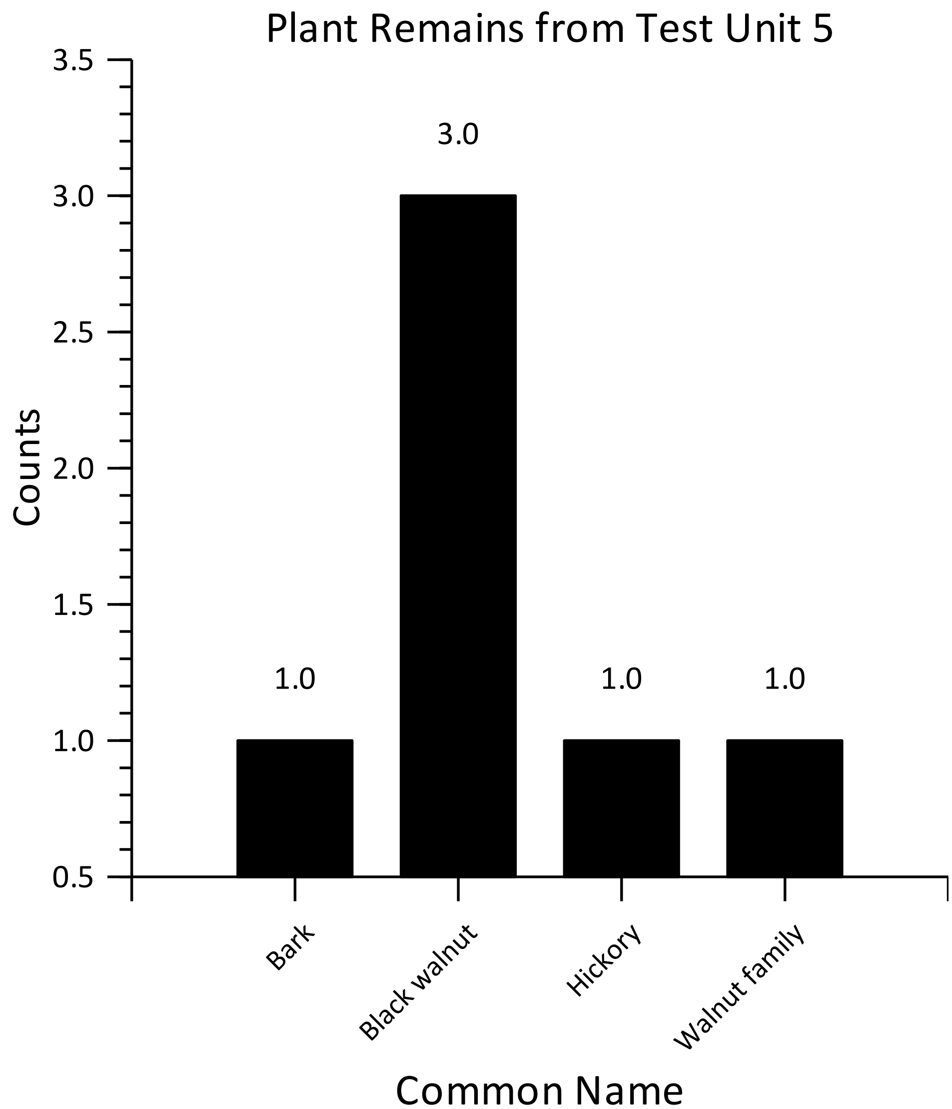

Figure 24. Plant remains from Test Unit 5.

Table 14. Comparison Ratios of Test Unit 7.

Zone	Grouped Taxa	Count/Plant Weight (g)	Value
A	Fruit	2 : 1.52	1.32
A	Introduced cultigen	19 : 1.52	12.5
A	Miscellaneous	10 : 1.52	6.58
A	Native cultigen	6 : 1.52	3.95
A	Nuts	12 : 1.52	7.89
A	Peach/black walnut	12 : 1.52	7.89
B	Fruit	4 : 0.77	5.19
B	Introduced cultigen	6 : 0.77	7.79
B	Miscellaneous	10 : 0.77	12.99
B	Native cultigen	2 : 0.77	2.50
B	Nuts	14 : 0.77	18.18
B	Peach/black walnut	8 : 0.77	10.39
D	Fruit	----	----
D	Introduced cultigen	5 : 1.2	4.17
D	Miscellaneous	8 : 1.2	6.67
D	Native cultigen	1 : 1.2	0.83
D	Nuts	13 : 1.2	10.83
D	Peach/black walnut	----	----

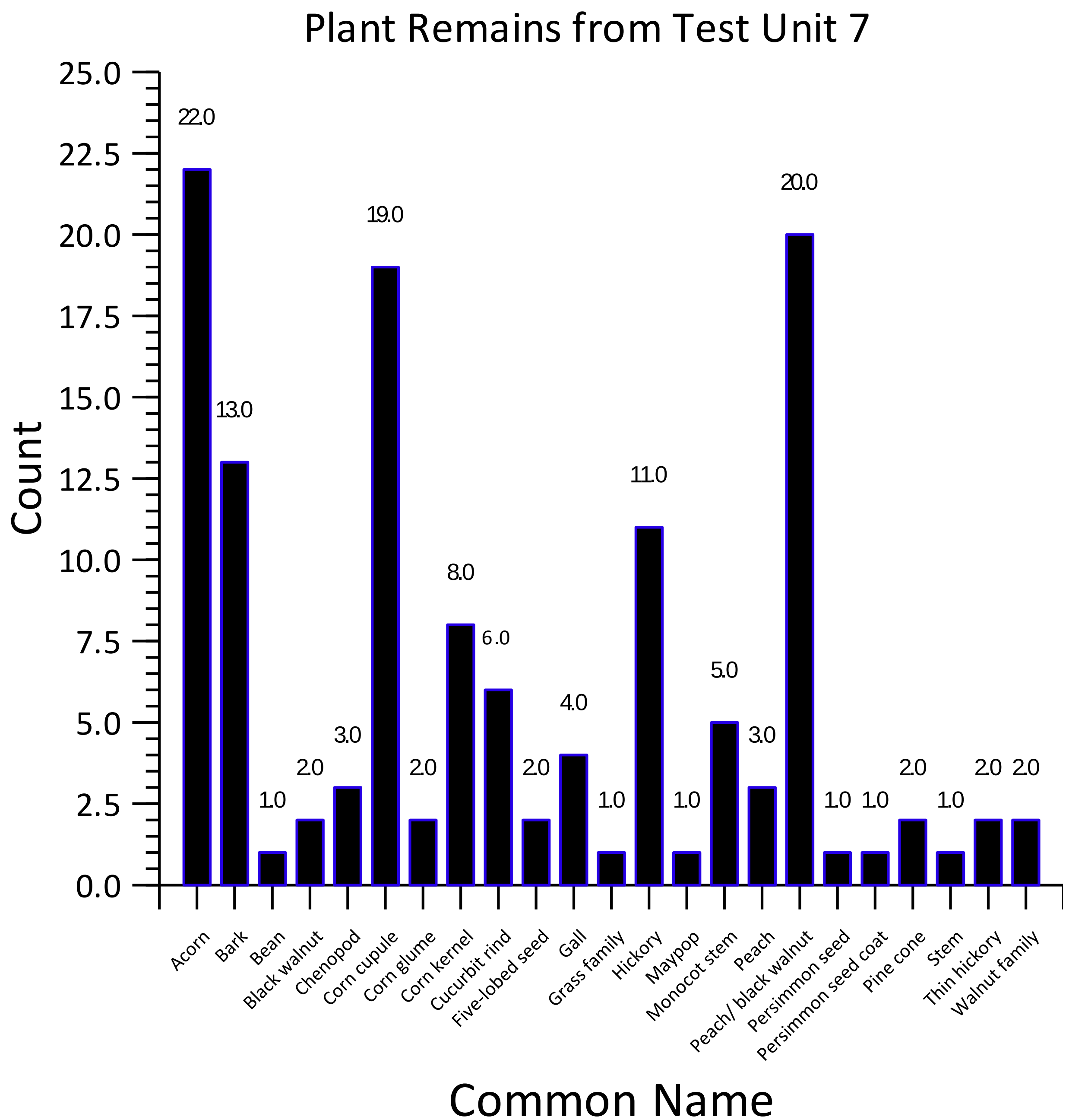

Figure 25. Plant remains from Test Unit 7.

Zone D was present in the northwest quadrant of TU 7, and appeared to be a mixture of Zones A, B, C, and subsoil (Angst 2013:27). Zone D was six cm thick (43-49 cmbd). The majority of plant remains from Zone D were nuts, primarily acorn and some hickory. Corn cupules, corn kernels and cucurbit rind were also present. Miscellaneous taxa included bark, monocot stem, stem, and insect gall.

Zone B was a thin, ashy layer three cm thick (27-30 cmbd). Zone B, like Zone D, contained mostly nuts, including acorn, black walnut, hickory, and walnut family nutshell. Corn cupules, a corn glume, and a tentatively identified corn kernel, and cucurbit rind were present in Zone B. Maypop, peach, persimmon, peach/black walnut, and a tentatively identified plum/cherry were present in the sample. Miscellaneous taxa included bark, pine cone, and insect gall.

Zone A was ten cm thick (11-21 cmbd) in TU 7, and was the only zone present in the other three test units discussed. Corn, beans, squash, and chenopod were well represented in Zone A. Just as in the lower zones, Zone A contained plenty of nutshells from acorns, black walnuts, hickory, and thin hickory. Peach, persimmon, and tentatively identified plum/cherry were also all present in Zone A. Miscellaneous taxa included bark, monocot stem, and pine cone. Weedy seeds included grass family and five-lobed seeds, as well as tentatively identified bedstraw and aster family.

Test Unit 10

Test Unit 10 was located near the center of the floor midden in the northeastern quadrant of Structure 1. TU 10 consisted only of Zone A, which was ten cm thick (14-24 cmbd). A total of

2.82 g of plant material was present in TU 10, 2.20 g of which was wood. Plant taxa from TU 10 were similar to those from other test units (Figure 26; Table 15). Nuts included acorn, black walnut, hickory, and possible chestnut. Cultigens included corn cupules and kernels, cucurbit rind, and a tentatively identified bean. Fruits included one peach fragment, a possible peach/black walnut, and tentatively identified persimmon and plum/cherry. Miscellaneous taxa consisted of cane, bedstraw, and a tentatively identified St. Johnswort seed.

Test Unit 11

Test Unit 11 was located to the west of TU 10 in the northwestern quadrant of Structure 1. TU 11 consisted of one zone (Zone A), which was nine cm thick (9-18 cmbd). TU 11 contained 1.97 g of plant material, of which 1.37 g was wood. Nuts present in TU 11 included primarily black walnut, along with acorn, hickory, and walnut family (Figure 27; Table 16). A possible plum/cherry pit was also tentatively identified. Corn cupules, glumes, and kernels were all present, as well as cucurbit rind, ragweed, and oily seeds. Miscellaneous taxa included bedstraw, bud, insect gall, and several unidentified tiny seeds.

Discussion

The four test units in Structure 1 appear to be relatively homogenous throughout the floor midden. It is unclear whether the midden was deposited during occupation or after the house was abandoned. The hearth was covered by the floor midden, either because the house basin was used to dispose of trash after the house was no longer occupied, or more likely because the midden was washed over the hearth after abandonment (Angst 2013:27). Regardless, the plant remains within the floor midden appear to reflect the diversity of plants used by the occupants

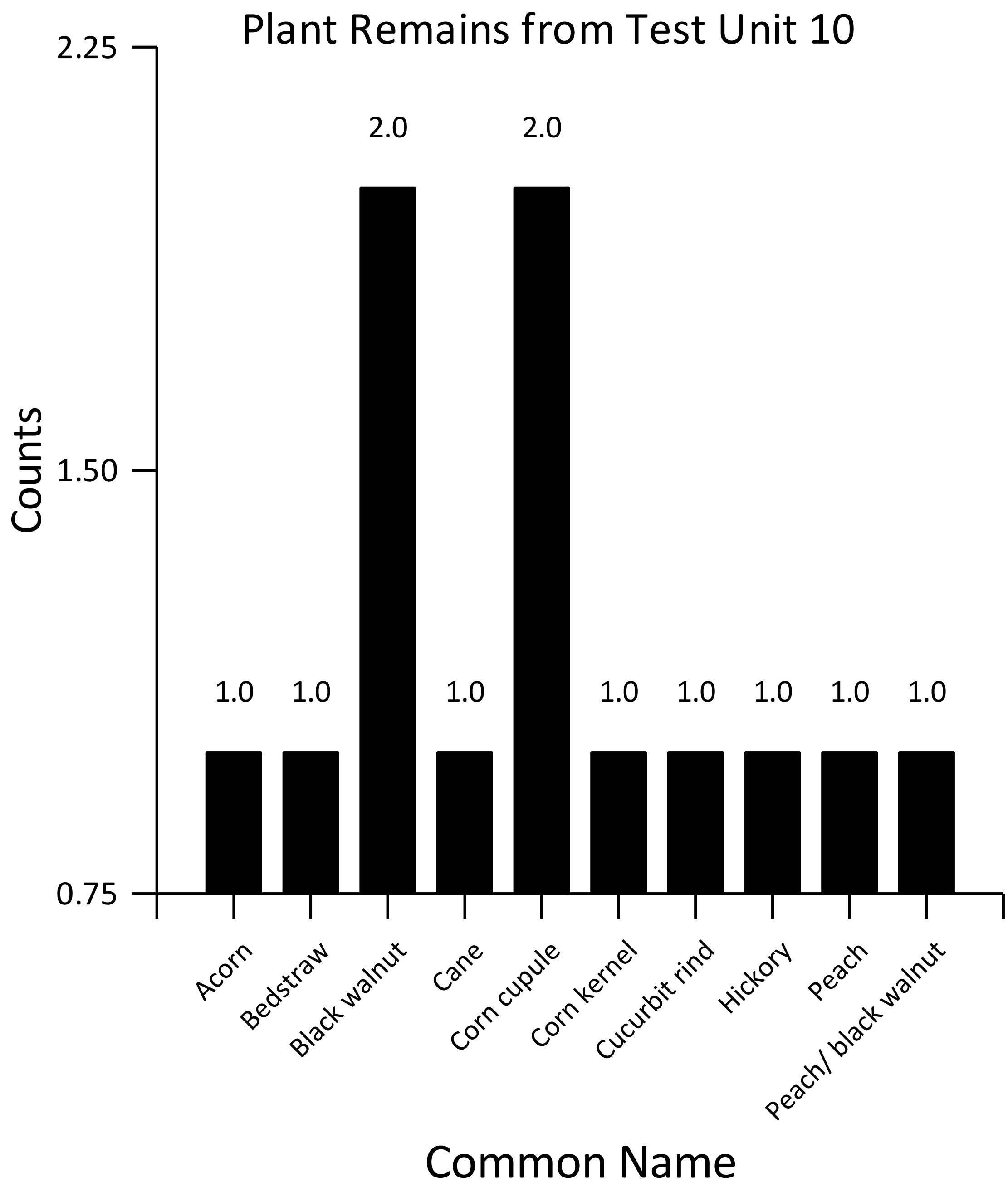

Figure 26. Plant remains from Test Unit 10.

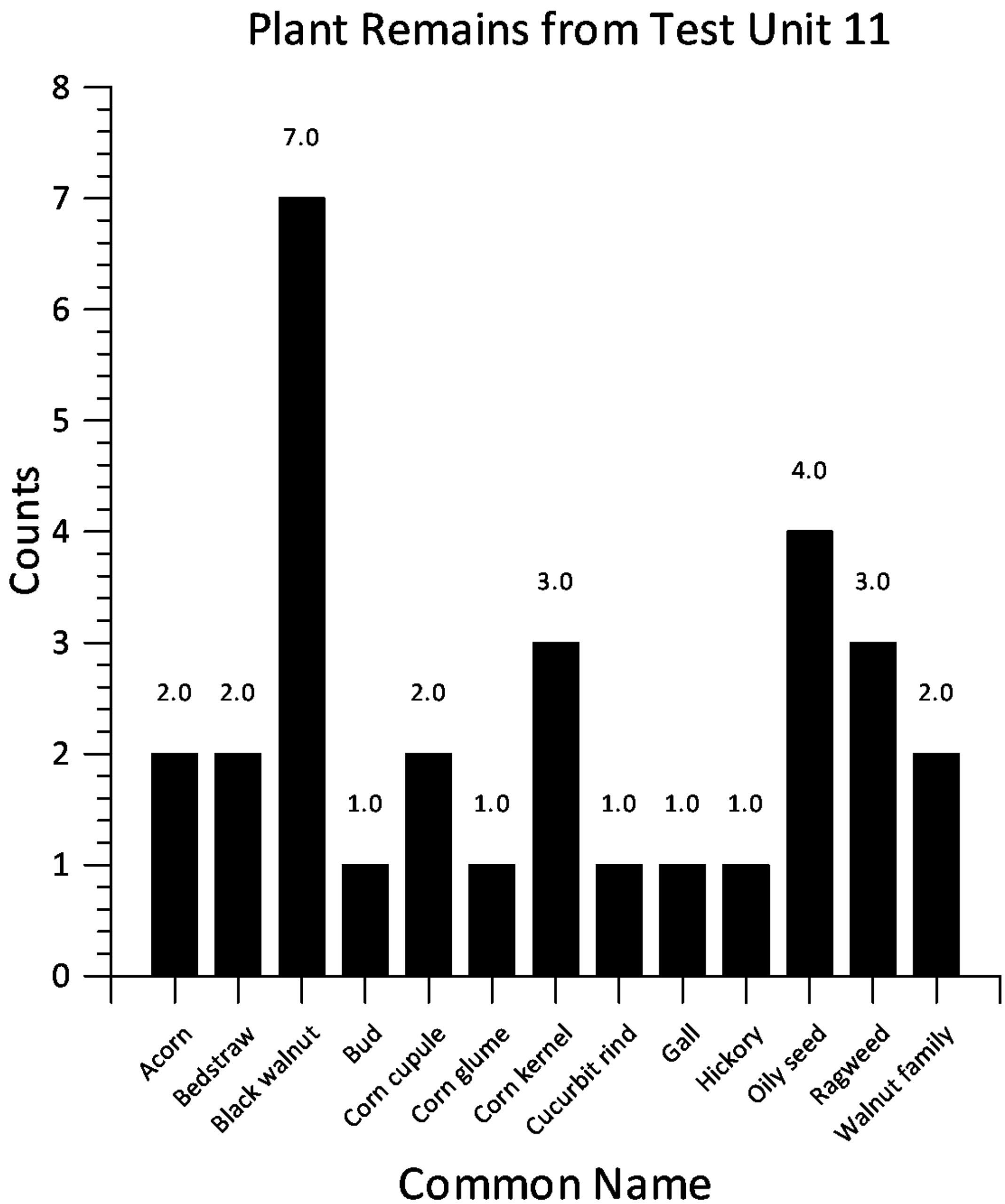

Figure 27. Plant remains from Test Unit 11.

Table 15. Comparison Ratios for Test Unit 10 Zone A.

Grouped Taxa	Count/Plant Weight (g)	Value
Fruit	1 : 0.62	1.61
Introduced cultigen	3 : 0.62	4.34
Miscellaneous	3 : 0.62	4.34
Native cultigen	1 : 0.62	1.61
Nuts	4 : 0.62	6.45
Peach/black walnut	1 : 0.62	1.61

during the Late Qualla phase. When plant remains from the test units are compared to those in the hearth, they mostly contain the same types of plants.

Plant remains from the summer house (Structure 3) are in many ways similar to those from the winter house (Structure 1). Just as in Structure 1, there were a large number of nutshells in the postmolds from Structure 3, including acorn, black walnut, hickory, and walnut family (Figure 28). Introduced domesticates included corn and beans, and of the corn remains there are cupules, glumes, and kernels present in both houses. Squash rind was present in both houses, but other native cultigens differ between the two contexts. Maygrass and knotweed were represented in the summer house by only one seed each. Comparatively, the winter house contained many chenopod and ragweed seeds. Fruits were also better represented in the winter house by a larger number and variety, including peach, persimmon, maypop, and tentatively identified plum/cherry and hawthorn. The postmolds in the summer house contained only one peach pit and one

Table 16. Comparison Ratios for Test Unit 11 Zone A.

Grouped Taxa	Count/Plant Weight (g)	Value
Fruit	----	----
Introduced cultigen	6 : 0.6	10.0
Miscellaneous	50 : 0.6	83.3
Native cultigen	8 : 0.6	13.3
Nuts	12 : 0.6	20.0

blackberry/raspberry seed. Structural materials in the summer house included bark, cane, monocot stem, and pine cone, but only one weedy seed (bedstraw) was identified. Since Qualla summer houses were generally at least partially open, I would expect to see more of these weedy seeds. The relatively low amount of plant remains from Structure 3 could possibly be due to a number of natural and cultural influences. Since summer houses are more open than winter structures and there is no evidence for a hearth within the structure, perhaps plant remains did not become carbonized as easily as in the winter house, were washed or blown away, or otherwise spread out beyond the structure. Primary food preparation may have taken place outside of the structure, the floor may have been swept, and/or the occupants may not have spent as much time in the summer house as they did in the winter house.

Comparing the Pisgah and Qualla phase hearths

The central hearths in these winter houses provided warmth and light, and were used for cooking and other activities, such as drying fruits and herbs for storage. Plant and animal food

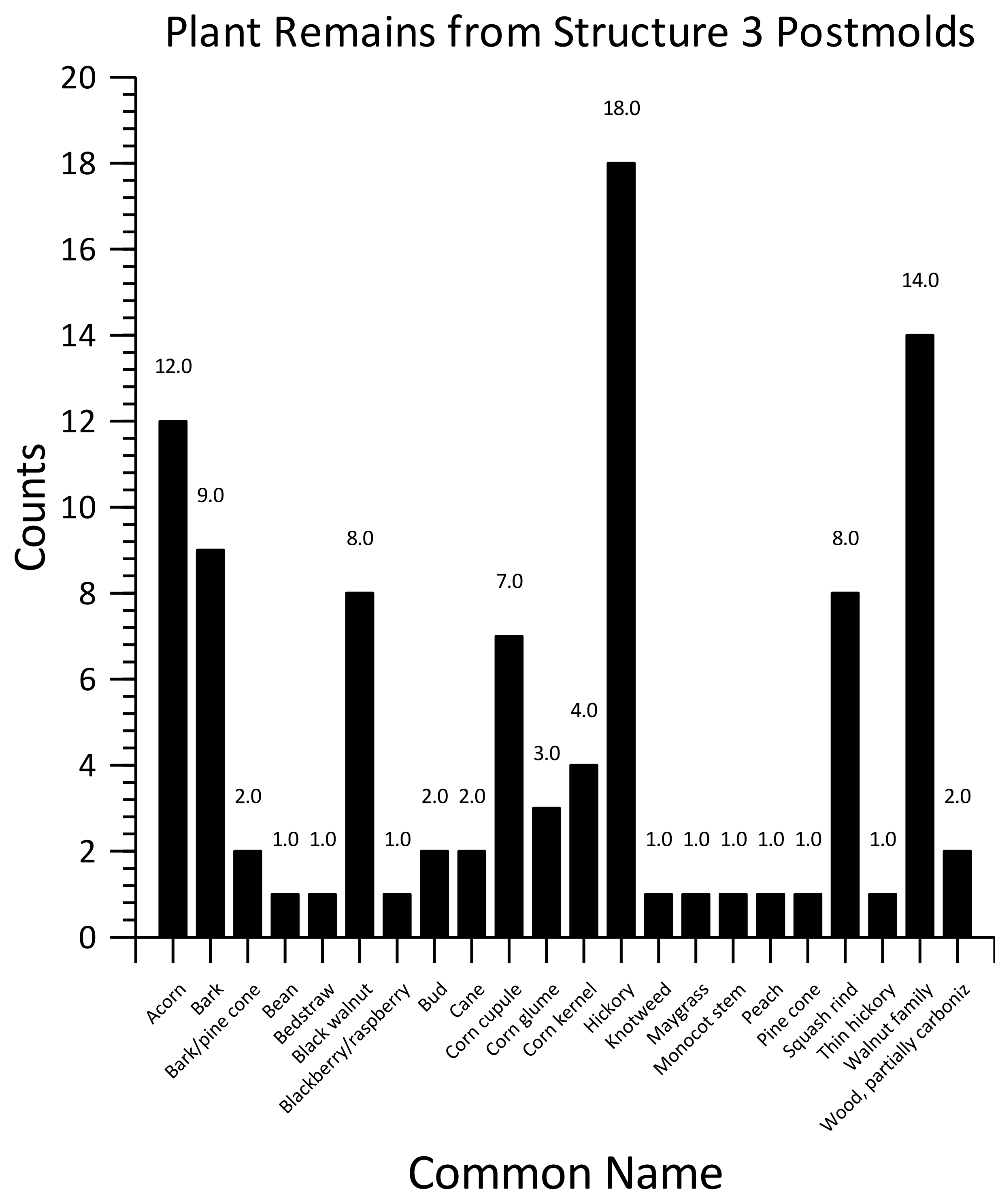

Figure 28. Plant Remains from Structure 3 Postmolds.

remains in both hearths suggest that foods were cooked over these fires; however, there may also be differences in the way foods were cooked and how the fire was maintained.

The Pisgah hearth (Feature 93) is shallower and contains less wood and pitch than the Qualla hearth (Table 17). Nutshell present in Feature 93 could have been discarded into the fire during nut processing, used primarily as fuel, or both. Corn cupules and glumes can also be evidence of discard, fuel or both. Food remains from corn kernels, chenopod, bearsfoot, and blackberry/raspberry are all well represented in the Pisgah hearth. Animal remains are scarce in this feature, with calcined bone from one small mammal and one frog/toad present (Vavrasek 2013:124).

The Qualla hearth (Feature 87) contains several zones and about twice as much pitch and wood per total plant weight than the Pisgah hearth (Table 17). Feature 87 has more nutshell, corn cupules, and glumes than the Pisgah hearth. These remains were likely used to fuel the fire in the Qualla house. Animal remains from the Qualla hearth are calcined bone, which is evidence of a fire that burned at a high temperature for an extended period of time (Vavrasek 2013:126). The large amount of pitch recovered in the archaeobotanical samples from the hearth also suggests that the fire was burned in this manner.

Animal bone in the Qualla hearth represents a wide variety of mammals large and small, as well as birds, frogs, and toads. The presence of such diversity of animal remains indicates that the hearth was used for cooking (Vavrasek 2013:125). Initial analysis of archaeobotanical remains from the Qualla hearth seems to suggest that the majority of plants present in the hearth were likely used for fuel, since there are relatively few fruits, corn kernels, beans, and native cultigens. However, it is likely that, given the intensity of the fire, some of the plant foods spilled or discarded into the fire may have burned and fragmented beyond recognition. Plant parts with high sugar content, such as corn kernels, beans, fruits, nutmeats, and starchy seeds, will tend to burn up under such conditions. This results in vitrified remains that are fragile and have retained little of their original structure. Although there are not many non-waste plant food remains in the fire, it seems likely that if they were cooking meat in the hearth, then they were also cooking corn, beans, squash, and other plant foods prevalent in the floor midden of Structure 1.

Although both hearths appear to have been used for cooking, archaeobotanical remains indicate they were used somewhat differently. The Qualla hearth appears more complex, with multiple zones and a much higher amount of wood and pitch. Comparatively, there is much less wood and pitch in the Pisgah hearth, and it appears to have only two zones that define it. This may be interpreted in a number of ways. The Qualla hearth may have been used continuously for a longer period of time than the Pisgah hearth. The Pisgah hearth may have been swept frequently while the Qualla hearth was not, which may also help explain why weedy seeds and large amounts of animal bone were present in the Qualla hearth, but absent in the Pisgah hearth. Or perhaps more household trash was discarded in the Qualla hearth than in the Pisgah hearth. The occupants of the Qualla house may have cooked larger pieces of meat such as deer or cooked them more often, so the hearth may have needed to be larger and hotter to accommodate this type of cooking activity. This is not to say that the occupants of the Pisgah house were not eating large animals or eating them in the same quantities, but if the hearth had been recently swept then the majority of animal bones would have been removed. James Adair (1775:399) described a method of baking bread in which a “strong blazing fire” was built, and when it burned down to coals, the coals and ashes were raked off to each side. The bread, which was first seeped in hot water, was placed in the hearth and covered with an “earthen bason” [*sic*], then covered with embers and coals (Adair 1775:399). The complexity of Feature 87 may be due in part to bread being baked in this manner.

Table 17. Comparison Ratios of Wood and Pitch in the Pisgah and Late Qualla Phase Hearths.

Context	Wood weight (g) /Total plant weight (g)	Value
Pisgah	1.04 : 2.4	0.43
Qualla	14.85 : 19.57	0.76

Context	Pitch /Total plant weight (g)	Value
Pisgah	29 : 2.4	12.08
Qualla	560 : 19.57	26.62

Chapter 4

Interpreting Results

Paleoethnobotanists refer to ethnohistorical, ethnographic, and experimental observations to make sense of the patterns seen in plant data. Ethnohistorical accounts from European explorers, traders, and settlers sometimes provide detailed accounts of plant use, gathering, gardening, and farming during the Contact period. Some ethnographic data from modern Cherokee populations by ethnographers such as William Banks (1953), and Gayle Fritz, Virginia Drywater Whitekiller, and James W. McIntosh (2001) provide information about traditional plant use among modern Cherokees. Documented plant use in the ethnohistorical and ethnographic records are useful when making sense of archaeobotanical data, but since there was no record of how plants were used before European contact, we can only assume that plants were used in similar ways and for similar reasons through the Woodland and Mississippian periods as well. Archaeobotanical data by itself can tell us about the types of plants people used, but not necessarily how meals were prepared, how medicines were made, utilitarian applications of plant materials, or the way plants are linked to religion and ritual.

Archaeobotanical remains can provide information about people in the past that is not evident from other types of archaeological or ethnohistorical data. Ethnocentric biases, misinterpretations, and the absence of documented observations regarding the use of plants must be considered when using these documents to interpret plant data. The archaeobotanical record can have biases of its own. When interpreting the use of plants on archaeological sites, factors such as deposition, disturbance, preservation, and methods of collection must be kept in mind to prevent coming to erroneous conclusions. These influences on the archaeobotanical record have to carefully be taken into consideration as results are quantified, compared, and discussed.

Finally, although archaeobotanical data provide a wealth of information about the use of plants among Native American peoples, most charred plant remains collected from open-air sites like Smokemont cannot satisfactorily be used as a direct dietary correlation or to indicate that one food source was more important than another (Pearsall 2000). Plant remains recovered archaeologically only provide a sample of what was eaten, and the samples collected are highly influenced by cultural, preservational, and sampling biases. Therefore, archaeobotanical samples provide a window into what people in the past were eating, but do not provide the total picture (Fritz 1994**).** Still, the nutritional value of foods can be considered when discussing the use of foods as sources of plant protein, carbohydrates, etc. and how foods eaten together can complement one another, such as corn and beans.

In this chapter, I discuss ethnohistoric and ethnographic interpretations of how plants were used by Native Americans in the past, as well as nutritional data and experimental observations. I will review the culinary, medicinal, and other uses for each designated category of plant remains recovered at the Smokemont site. Then, I will discuss archaeobotanical data more broadly, comparing the plant remains from the different phases at Smokemont to those collected at other archaeological sites throughout the Appalachian Summit. Because of difference in site context (burned versus not burned houses, for example) and collection methods (flotation versus dry screening), sites will be compared qualitatively.

Plant Use in the Southeastern United States

Much of what we know about how plants found archaeologically were prepared as meals, administered as medicines, or made into utilitarian objects, comes from ethnohistoric and ethnographic sources. Turning to ethnobotany can help paleoethnobotanists make sense of archaeological plant remains. Plant ecology, nutritional data, and experimental observations are also considered. I have not listed all potential uses for every plant found at Smokemont here, but I have attempted to provide a good representation of how these plants were used on a day-to-day basis.

Nuts

Throughout the prehistoric periods, nuts were the most important wild plant foods for people in the Eastern Woodlands (Scarry 2003:57). We see an example of the importance of nuts in the two Connestee pits at Smokemont, and a continued use of nuts as a food resource through the Contact period. Nuts vary in the way they are collected, processed, stored, and prepared (Scarry 2003:57). Native Americans may have encouraged nut- and fruit-bearing trees to grow near their settlements by clearing land to provide suitable habitats for these plants (Hill 1997:10).

Hickory nuts, black walnuts, and butternuts all belong to the walnut family (Juglandaceae) (Scarry 2003:57). Hickory and black walnut shell were found in all contexts at Smokemont, and many nutshell fragments could only be identified as walnut family. Hickory trees grow in groves, and produce heavy crops every two to three years with lighter crops in between (Scarry 2003:60). The thick shells of hickories tend to protect them from insects and mold, but if they are not collected within a week or two animals will quickly eat them (Scarry

2003:60; Talalay *et al.* 1984:345). Women would carry baskets out to the woods from September through December to gather hickory nuts (Hill 1997:10). Walnut trees tend to be less abundant than hickories, but their nuts are larger and available for a longer period of time due to the bitter husk covering the nuts which makes them unappealing to wildlife (Scarry 2003:64; Talalay *et al.* 1984:346-348). Walnut trees produce good crops every two to three years (Scarry 2003:64).

Hickory nuts have a high fat content and moderate quantities of protein, although they lack critical amino acids and are a poor source of carbohydrates (Scarry 2003:61). Hickory nuts were highly desirable because they could be collected in bulk and stored for extended periods of time (Scarry 2003:61; Schopmeyer 1974:271). Since separating hickory nutmeats would be impractical, the entire nut was often crushed and used to make soups and decant oil from the nut (Scarry 2003:61). Hickory nuts would be cracked and pounded, creating a sticky mixture of nutmeats and nutshell fragments that would be formed into balls to be stored, shared, or taken along when traveling (Fritz *et al.* 2001:1). Hickory nut soup (*ku-nu-che*) has been documented ethnohistorically as a traditional food among Cherokee people in eastern Oklahoma. These hickory nut balls could then be used to make a soup by dropping them into hot water, strained to remove the nutshell fragments, and then mixed with hominy (Fritz *et al.* 2001:1).

Europeans reported that hickory nuts were sometimes eaten raw, or pounded in mortars with water to make “hickory milk” (Hariot 1893:27-28; Swanton 1946:273). Adair described the result of this process as “an oily, tough, white substance” that was called “hickory milk by traders, and the ‘flesh’ or ‘fat’ of hickory nuts” by Native Americans (Adair 1775:408; Swanton 1946:365). Bartram described hickory milk as a beverage “as sweet and rich as fresh cream”

(Hill 1997:10; Waselkov and Braund 1995:152). Hickory milk was consumed by Native Americans with various types of bread (Adair 1775:408; Swanton 1946:365). Nutshell sinks to the bottom, and the oil floats on top where it can then be skimmed off and stored for a period of time (Scarry 2003:61). The decanting of hickory nut oil may span back to at least the Middle Archaic period, during which lined pits were filled with water and crushed hickories and heated stones were added to render the oil (Munson 1986; Scarry 2003:61).

Walnuts contain more plant protein than any of the other nuts in the Eastern Woodlands. Walnuts have hard shells and are difficult to crack, but once open the nutmeats come out easily. Walnuts, like hickory nuts, can be stored for long periods of time (Scarry 2003:64). It is not likely that oil was extracted from black walnuts in a manner similar to hickory nut boiling since the tannin-filled husks would have to be removed from every ridge of the walnut shell before processing to prevent the oil from being unpalatable (Scarry 2003:64; Talalay *et al.* 1984: 354-355). The tannins in black walnut hulls, roots, leaves, stems, and bark were collected by Cherokee women who crushed and boiled them to create a brown dye (Hill 1997:10, 42). Roots and bark could be collected at any time of the year, dried, and stored for future use (Hill 1997:42). Women also used walnuts as medicines "by peeling out the inner bark of trees and roots to pound and boil for cathartics" (Hill 1997:10).

The beech family (Fagaceae) includes acorns, chestnuts, chinquapins, and beechnuts (Scarry 2003:65). Of the identified nutshell from Smokemont, acorns and chestnuts were present in all time periods. Acorns can be divided into sweet white-oak acorns, and tannin-rich red-oak acorns. White-oak acorns take about one year to mature, whereas red-oak acorns take two years

(Scarry 2003:65-66). Oak trees produce a good crop of nuts every two to three years, and acorns must be harvested immediately after dropping. Because they have thin shells, white-oak acorns sprout shortly after falling, and are susceptible to insect and mold infestations more so than thicker-shelled varieties of nuts. Additionally, wildlife will eat sweet white-oak acorns if they are not gathered quickly (Scarry 2003:66). On the other hand, the tannic acid in red-oak acorns makes them more resistant to insects and mold, and their bitter taste makes them less appealing to animals that will ignore them until the sweet acorns are gone (Petruso and Wickens 1984; Scarry 2003:66).

Acorns have little fat or protein, but are a good source of carbohydrates (Scarry 2003:66). Because they have thin shells, acorns must be parched before they can be stored to prevent sprouting, insect and mold infestations (Petruso and Wickens 1984:362; Scarry 2003:66). Once parched, white-oak acorns are ready to be used, but red-oak acorns must have their tannin removed before they can be eaten. After being parched, tannin can be removed from red-oak acorns by boiling them in water or water with ashes or by soaking them in pits of fresh water (Scarry 2003:66). After the tannins were removed, both types of acorns were used primarily as a source of starch to make breads, gruel, or pastes to thicken broths. Acorns were also documented as being used to extract oil (Scarry 2003:66; Swanton 1946:260, 277).

Chestnuts were reportedly parched and cooked in the same way as sweet acorns, eaten raw, smashed and boiled to make “spoonemeate” [*sic*], and ground into meal to make bread (Hariot 1893:27-28; Scarry 2003:66; Swanton 1946:265,272, 364-365). In the 1700s, women traded bushels of chestnuts to white settlers (Hawkins 1974:18; Hill 1997:10; Schafale and

Weakley 1990:62-64). Before the twentieth century chestnut trees were plentiful in the region, producing so many nuts that foraging game animals "grew so fat from the nuts they could scarcely escape hunters" (Hill 1997:10).

Hazelnuts are different from the other nut species found at Smokemont because they come from a shrub that is low to the ground rather than a tree. Hazelnuts ripen from late summer until late fall, but are collected primarily in the fall when the papery bracts that enclose the nut dry and open to release the nuts. Because animals quickly eat the nuts once they fall from the bush, the most effective method of collecting hazelnuts is to pick them or beat them from the shrubs after the leaves have fallen but before the bracts have completely split. Hazelnuts have a high fat content, moderate protein, and low levels of carbohydrates, making them more nutritionally similar to the walnut family than the beech family. Hazelnuts are easy to crack with a large nut that is loose within the shell (Scarry 2003:65).

Fruits

Fleshy fruits such as berries, persimmon, and plums are often found in forest clearings, along forest and stream borders, and in anthropogenic habitats. Whether or not they did so intentionally, Native Americans encouraged fruiting plants to grow in areas such as garden plots, field edges, and other disturbed areas around settlements (Scarry 2003:68). Various fruits have been identified in samples from all three contexts at Smokemont, particularly persimmon and in the Late Qualla phase, as well as peach (see "European-Introduced Crops").

Although fruits provide essential vitamins and minerals, they were probably supplemental resources (Scarry 2003:68). Fruits were eaten raw, added to soups and dried foods like pemmican, or dried for winter use (Scarry 2003:69). Dried persimmons and maypops (the fruit of passion flower vines) were made into cakes or "bricks of bread," and were a staple (Scarry 2003:69; Swanton 1946:265). Particularly plums and persimmons were dried, but Adair remarked that Native Americans dried "such kinds of fruit as will bear it" (Adair 1775; Swanton 1946:265; 363). Fruits were spread on hurdles over the fire or dried in the sun (Scarry 2003:69). Some fruits were scraped over a sieve to remove their seeds before being formed into loaves (Swanton 1946:363). Ripe pods of honey locust were split and soaked in hot water before being strained and drank as a hot or cold beverage (Hudson 1976:309). Maypops were also used to make a hot beverage by boiling the fruit until it was soft, and then straining the pulp (Hudson 1976:309; USDA-NRCS 2013). Passion flower vines may have been cultivated in gardens as early as 2,000 years ago (Hollenbach and Purcell 2013:115; Yarnell 1993). Besides the fruits, spring shoots of many fruiting plants such as blackberries/raspberries and maypops can be eaten as greens, and blackberry/raspberry leaves can be used to make tea (Fernald and Kinsey 1943:236; Kuhnlein and Turner 1991:265; Medsger 1972:23; Peterson 1977:184, 198).

Fruiting plants also had many medicinal uses, some of which I have included here. Blackberry/raspberry roots were used to cure colds. The sweet pulp of honey locust pods could be eaten raw or used to sweeten medicines (Moerman 2004). Passion flower roots were used by Native Americans as a poultice for boils, cuts, earaches, and inflammation. The crushed root would also be used to treat liver problems, as a sedative, or as a "blood tonic." The dried leaves were also used to treat insomnia or given to babies to aid in weaning (USDA-NRCS 2013). Persimmon was important among the Cherokees as a medicine for a number of gastrointestinal problems, as an astringent, as a liver aid, and to cure hemorrhoids, tooth aches, diarrhea, and venereal diseases (Moerman 2004).

Native Cultigens

During the Woodland period, edible seeds were at the height of their importance. Although there appears to have been a greater reliance on native crops by the Middle Woodland period, these plants were still supplemental, adding on to long-established food production patterns (Smith and Cowan 2003:116). People living during the Connestee phase still hunted and gathered most of their food, and native cultigens received little investment. However, native cultigens were still used by Native Americans during the Mississippian and Contact periods when corn became the predominant crop.

Under “native cultigens,” I have included the plant remains from Smokemont that fall into the category of grains and oil seeds cultivated as native crops—cucurbits (including native wild gourds), sunflower, sumpweed, chenopod, knotweed, maygrass, little barley, and marshelder (Scarry 2003:70; Smith and Cowan 2003:106). Of these crops, all but knotweed, marshelder, and little barley are present in Smokemont plant assemblages. I also include two other oil seeds from the composite family (Compositae) that were probably used the same way as sunflower and sumpweed, and likely also cultivated—ragweed and bearsfoot (Scarry 2003:70). Because ragweed and bearsfoot are well-represented in the archaeobotanical samples from Smokemont, it seems likely that they were used in this manner. It is important to mention that seeds belonging to the grass family (Poaceae) may have also been harvested as grains used for food, but I have left them in the miscellaneous category since it is difficult to identify them further than family or subfamily and they could have also served other purposes such as thatching, bedding, or lining storage pits (Scarry 2003:70).

Seeds from domesticated plants uncovered in archaeological context are either larger or have a thinner seed coat than the present-day wild varieties (Smith and Cowan 2003:106). Chenopod seed shape and texture changed when it was domesticated by 1500 B.C. (calibrated) (Scarry 2008:394; Smith 2011; Table 18). Initial domestication may have been due to deliberate selection by humans for larger seeds that are easier to process, or the result of the plants responding to new selective pressures that accompany deliberate planting (Smith and Cowan 2003:106-107). The initial domestication of plants in eastern North America may have been an experiment to produce a food source that has a higher yield and reliability, therefore increasing relative economic security (Smith and Cowan 2003:111).

Native cultigens such as chenopod, knotweed, maygrass, and little barley have small seeds and were likely planted by broadcast sowing in prepared fields rather than being individually planted (Scarry 2008:397; Smith and Cowan 2003:119). Squashes were likely

Table 18. Earliest Domestication of Seed Crops in Eastern North America from Smith 2011.

Plant Species	**Age (radiocarbon years BP)**
Pepo **squash (*Cucurbita pepo* spp. *ovifera*)**	**4440 ± 75**
Sunflower (*Helianthus annus*)	**4265 ± 60**
Marshelder (*Iva annua*)	**3920 ± 40**
Chenopod (*Chenopodium berlandieri*)	**3490 ±40 to 3400 ± 150**

planted in areas where their vines had room to spread or climb, such as along the edges of fields (Scarry 2008:397). Sunflowers and sumpweeds may have initially been broadcast planted, but once the seeds and plants enlarged due to domestication, native women likely switched to planting them in hills along the edge of fields as well (Scarry 2008:397; Wilson 1987).

Small grains and composites were likely harvested by hand stripping or by beating the plants over containers that would catch the falling seeds (Scarry 2008:398). Grains were parched to remove the chaff and to extend the length of time they could be stored. These grains were ground into meal and added to stews or made into bread (Scarry 2003:71). Oil seeds were used in a similar manner once removed from their woody seed coats (pericarps) (Scarry 2003:71; Swanton 1946:269, 288). Some grains, such as maygrass and little barley, ripen in the late spring, likely around the time when winter stores were depleted and other plant foods were unavailable (Scarry 2003:71). Most of the other edible seeds, such as bearsfoot, chenopod, sumpweed, and sunflower bloom late summer through early fall (Radford *et al.* 1964 ; VanDerwarker and Stanyard 2009:144).

Chenopod and knotweed have edible leaves, which may have been welcomed in the spring after people had spent the winter living on stored foods (Scarry 2003:73). Although these plants were likely primarily used for their grain, their leafy greens provide excellent sources of vitamins and minerals. Young shoots can be eaten raw or cooked as potherbs. Because archaeobotanical evidence of the use of greens is indirect, attributed to the presence of charred seeds, it is difficult to determine their importance in the Native American diet. Additionally, there are few ethnobotanical accounts that mention eating greens in the Eastern Woodlands.

Many weedy annuals, roots, and tubers were also likely used, although they do not preserve well archaeologically (Scarry 2003:73).

Bottle gourds (*Lagenaria siceraria*) are perhaps the oldest cultivated plant in North America, and they had a variety of uses. Bottle gourds grew in a number of different sizes, from a few inches to fourteen inches in diameter. Bottle gourds were used to make water vessels, utensils, bird houses, rattles, and masks among other items (Hudson 1976:294).

Domesticated plants were primarily used as a food source, but some of these plants also had some medicinal uses as well. The seeds and roots of the bearsfoot plant were used to make salves for burns, cuts, and inflammations (Moerman 2004; VanDerwarker and Stanyard 2009: 138). Ragweed leaves were used as a dermatological aid, as a disinfectant that was applied to infected toes, and was an ingredient in green corn medicine (Moerman 2004).

Introduced New World Crops

The most important introduced crop to Southeastern Indians was maize. By A.D. 100-200, maize was present across the eastern Woodlands, but did not have much of a presence for more than six centuries after its introduction (Smith and Cowan 2003:117). The production and consumption of maize increased around A.D. 800-900, and became a staple food for people throughout the region by A.D. 1000 (Scarry 2008:395). Beans arrived in the Eastern Woodlands around A.D. 1200, and by the fifteenth century A.D. corn, beans, and squash (the “three sisters”) had largely displaced native cultigens (Hart *et al.* 2002; Hart and Scarry 1999; Scarry 2008:394-395). These foods far surpassed native cultigens in the diet of Native Americans. After the arrival of corn and beans in the Southeast, the cultivation of sumpweed declined, and it eventually reverted back to its smaller, wild form (Heiser 1985:171).

Introduced crops present in plant remains at Smokemont include corn, beans, squash, and tobacco. While some squashes were native, pumpkins (*Cucurbita pepo* spp. *pepo*) and cushaw squashes (*C. argyrosperma*) were introduced to the Eastern Woodlands from Mexico after A.D. 1000 (Scarry 2008:394). Differentiating between native and introduced varieties of squash requires measuring the thickness of the rinds recovered in archaeobotanical samples, which was not attempted with the cucurbits from Smokemont (Hollenbach and Purcell 2013:117).

Unlike native cultigens that could be broadcast-planted over prepared fields, maize kernels had to be individually sown, requiring space between them and regular weeding to limit plant competition. Planted fields had to be protected from animals such as birds, deer, and raccoons, and the women who tended the fields had to be protected from marauders. Although maize was easier to harvest than small-seeded native crops, it underwent a considerable amount of preparation before being consumed (Smith and Cowan 2003:119).

At least three varieties of corn were grown—flint, flour, and sweet (Smith and Cowan 2003:120). Each type of corn required special cooking techniques, although it was most commonly pounded into a meal and boiled (Smith and Cowan 2003:120). Ears of corn were dried and preserved for use during the winter months (Swanton 1946:352). Hominy was made by soaking dried kernels in wood ashes, then rinsing them to remove the lye and pericarp of the kernels (Smith and Cowan 2003:120). Cracked hominy was considered a hospitality food, and was served to guests by many Native Americans (Hudson 1976:305). Boiled hominy provided a staple dish throughout the Southeast that was referred to by the Creeks as *sofki*, and by Cherokees as *ganohe ni* (Hudson 1976:305; Swanton 1946:352). Jars of sofki would be put in warm places to sour and ferment slightly, and was then usually drunk cold (Hudson 1976:305). Sweet corn was eaten fresh or boiled and dried before being stored (Smith and Cowan 2003:120). Corn was also used as "roasting ears" (Swanton 1946:351). Flint corn was dried, parched, and ground into a meal that was then mixed with animal fat or dried fruits before being stored or taken along when traveling (Smith and Cowan 2003:120). Pounded corn meal was sifted through graduated cane sieves to produce a fine meal that was mixed with bear's oil to make cakes that were then baked on thin broad stones over the fire (Adair 1775:407-408; Swanton 1946:356). Bread was made by Native Americans in the Southeast by frying, boiling, or baking hominy meal (Hudson 1976:305). A favorite preparation of corn meal was to make boiled bread by wrapping it in husks, sometimes with chestnuts or beans, and boiling several packets of them at a time (Adair 1775:407-408; Swanton 1946:354).

Squash and pumpkins were boiled or broiled, and were cut into round slices which were peeled and dried (Hudson 1976:397; Ulmer and Beck 1951:54). The seeds of cucurbits could also be roasted and eaten (Hudson 1976:397). Some squash varieties could be stored in a cool dry place for use during the winter (Hudson 1976:293). Beans were boiled in water, often with meat and bear oil (Hudson 1976:397). Sometimes hominy, beans, and pumpkin were cooked together as a succotash (Hudson 1976:397; Ulmer and Beck 1951: 59). Boiled beans were also sometimes mashed and formed into small loaves (Hudson 1976:397).

The three sisters (corn, beans, and squash) are complementary both in the field and nutritionally. All three do well in the Southeast where it is hot and humid, and acidic soils are predominant. Some beans grow on vines, so planting them next to corn allows bean plants a place to climb. While corn removes nitrogen from the soil, beans replenish it. Corn lacks the essential amino acid lysine, which is abundant in beans, so when eaten together, corn and beans are a good source of vegetable protein (Hudson 1976:293-294). When corn is processed with wood-ash lye, some of the corn's essential amino acids are reduced, but the amount of lysine and niacin are dramatically increased. This would have been an important dietary staple for people heavily dependent on corn since this technique likely reduced the incidence of pellagra (Hudson 1976:304; Katz *et al.* 1974; Wright 1958).

In Cherokee mythology, corn and beans came from the first woman, Selu. Selu and the first man, Kana'ti, had one son, and one adopted son. Their adopted son, Wild Boy, had sprung from the blood of the game that Selu had washed in the river. The boys (Wild Boy in particular) were troublemakers who first let all of the game animals out of a cave Kana'ti kept them in. Then, they discovered that Selu produced beans by rubbing her armpits, and corn by rubbing her belly. Thinking she was a witch, the boys killed Selu and dragged her body around a clearing in a circle twice, and everywhere her blood fell on the ground corn sprang up (Mooney 1900:242-245). The link between corn and women was expressed annually during the Green Corn Ceremony, which placed women in the center of Cherokee religion (Perdue 1999:25).

Tobacco (*Nicotiana rustica* L.) is a small variety of tobacco native to the central Andes that was present in the Southeast before the arrival of Europeans (Hudson 1976:54, 353).

Tobacco appears in eastern North America between A.D. 100 and 200, although dates from sites in the Southwest are considerably earlier (Rafferty 2006:456). Tobacco likely moved into the region from the Southwest, following the same paths as other introduced plants such as maize (Rafferty 2006:456).

Tobacco was likely grown primarily by men in small gardens, sometimes in secluded areas (Hudson 1976:353; Wilson 1917). Native Americans used tobacco for both medicinal and ceremonial purposes, and it was one of the most important herbs used in the Southeast (Hudson 1976:353). Tobacco was smoked to suppress hunger, and applied to the skin as a poultice for a number of ailments (Hamel and Chiltoskey 1975; Hudson 1976:353; Knight 1975; Moerman 2004). Tobacco was cast into fires as a sacrifice to the gods, or tossed in the air if a storm was approaching or the person had escaped danger (Hariot 1893:25-26; Swanton 1946:382). Tobacco was also given to the water when a new fish weir was constructed (Hariot 1893:25-26; Swanton 1946:382). Native tobacco occupied, and still occupies, an important position in the ceremonial life and pharmacopoeia of the Cherokees (Swanton 1946:382), and many other Native Americans.

European-Introduced Plants

Europeans introduced several plant species to eastern North America, but only certain plants were adopted by Native Americans, including peaches, watermelons, cowpeas, field peas, and sweet potatoes. Peaches, watermelons, and cowpeas share several characteristics with native plant species grown by Native Americans, producing relatively high yields with little risk

(Gremillion 1993:15). There is evidence that field peas and possibly sweet potatoes were also adopted by Native Americans in the Little Tennessee River Valley (Chapman and Shea 1981).

Potatoes are New World domesticates, but were not introduced to North America until Europeans brought them northward from South America (Crosby 2003:66). Sweet potatoes (*Ipomoeae batatas*) appear to have been used in parts of the Southeast by at least the late 18th century (Swanton 1946:288). Chapman and Shea (1981:76) noted that a number of unidentified tubers, possibly sweet potatoes, appear on several Cherokee sites in the Little Tennessee River Valley. Because tubers do not preserve very well in the archaeological record, they are often absent in archaeological assemblages.

A species of tobacco, *N. tabacum* L., is also native to South America, but does not appear to have been present in eastern North America before Europeans arrived (Goodspeed 1954:375; Haberman 1984:269). *N. rustica* was eventually replaced by *N. tabacum*, which is considered a more favorable type of tobacco (Haberman 1984:269-270). The tobacco seed found in Pisgah context at Smokemont was identified only as *Nicotiana* sp., and was not identified to species.

Peaches were the only introduced Old World plant found in Late Qualla contexts at Smokemont. Peaches were introduced to the New World by Europeans as early as Columbus' second voyage (Gremillion 1993:16). Peach trees spread throughout the Southeast, and were mistaken by Bartram as an indigenous species (Gremillion 1993:17; Swanton 1946:279). Peaches grow in a manner similar to native fruiting plants, preferring clearings at the edges of fields and requiring little tending (Gremillion 1993:17). Peaches were added to the fruits eaten by people during the Late Qualla phase, but did not replace indigenous fruits in importance

(Gremillion 1993:17). The pits of peaches could be burned as fuel, so it is not surprising to see them end up in charred plant assemblages. The rough, deep ridges on the surface of peach pits look very similar to the outer shell of black walnuts, so distinguishing between the two on very small fragments can be difficult.

Peaches were dried in a manner similar to native fruits, and were often baked into loaves during the winter (Swanton 1946:364). The bark of peach trees was steeped to make a tea used as a cough medicine, to stop vomiting, or to cure “a sick stomach.” Ethnographically, cold peach bark tea and soda could also be applied to piles [hemorrhoids] (Banks 1953).

Miscellaneous

Miscellaneous taxa include plant remains that were used for building materials, as tinder and kindling for fires, tools, basket-making, dyes, medicines, or to supplement the diet. Many of the seeds in this category are from weedy plants that likely grew well in the disturbed environments created by humans, such as burning or clearing garden plots (Hollenbach and Purcell 2013:116). Several of these plants, such as cane and pokeweed, served multiple purposes, so determining exactly what the plant fragments at Smokemont were used for is difficult.

Cane was found in all contexts at Smokemont, which is not surprising since it was a very important plant in the daily lives of southeastern Native Americans. Cane was used for both utilitarian and ceremonial purposes (Hill 1997:40). It was burned as fuel, and used to make torches (Moerman 2004; Watson and Yarnell 1966). Cane provided raw material for building houses and for making hair ornaments, game sticks, musical instruments, toys, blow guns, and beds (Hill 1997:39-40). It was used to make benches inside of Qualla winter houses, and a piece of long cane was laid next to each bench so the occupants could use it to sweep the ashes of the central hearth when the fire died down (Hill 1997:71; Williams 1930:451-452). Women wove cane mats that covered house benches and beds, were used to decorate the interior walls, were woven for ceremonies, and were used to wrap the bodies of the dead (Hill 1997:40; Williams 1930:451-452).

Women made intricate baskets out of river cane (Hill 1997:40). Women used baskets during food collection and preparation, including nut gathering and sieving corn flour or fruit pulps. Cane spits were used to skewer thin slabs of meat that were then cooked over the fire (Hudson 1976:300). During lean times, Cherokees made flour out of cane (Hill 1997:40). Warriors going to battle would drink cane and root tea as part of a purification ritual (Hill 1997:40).

Monocot stems present in the Smokemont samples may have been braided to make cords, or woven into a number of items (Hollenbach and Purcell 2013:116). Bark and pine cone often show up together at Smokemont in both Connestee pits, in both the Pisgah and Qualla hearths, and in the Qualla winter house floor midden. Pine seeds do not appear to have been eaten by people in the Southeast, so pine cones must have served a practical purpose, perhaps used as tinder to start fires. Bark was used to line pits and as a building material, but was likely also used to tinder fires.

Seeds may have become charred when they were blown in from outside of the house, may have been carried in on clothing, or may have come from stored dried herbs, among other origins. Bedstraw, pokeweed and purslane have edible leafy greens that may have been eaten (Scarry 2003:73). Pokeweed was also used to make a pale red dye used to color cane splits made into baskets (Hill 1997:62). Crushed St. Johnswort plants were sniffed to stop nosebleeds, and the chewed roots eaten and applied to snakebites. Holly berries were eaten to aid in gastrointestinal problems. Tulip tree bark was used to cure pinworms or added to a cough syrup (Moerman 2004).

Comparing Smokemont to Other Archaeological Sites

Connestee Phase

Plant remains from the Connestee phase pit features at Smokemont can be compared to plant remains in the Ridge and Valley province in eastern Tennessee from the Icehouse Bottom, Birdwell, and Townsend sites. In the Blue Ridge province, Connestee phase plant remains from the Biltmore Mound site are compared (Table 19). Although there was a Connestee phase post mold uncovered in Mound No. 2 of Garden Creek, the plant remains from the feature have not yet been analyzed.

Some of the earliest corn in the Appalachian Summit has been found at the Icehouse Bottom site, with two of the glume fragments recovered dating to A.D. 405±160 (Chapman and Keel 1979:160; Chapman and Shea 1981:73). When corn was initially introduced to the area during the Middle Woodland period, it was likely used for ritualistic purposes rather than a subsistence crop (Scarry 1993; Smith and Cowan 2003:120). At Smokemont, there is one tentatively identified corn glume in the plant sample from Feature 132 Zone B. If early corn is

Table 19. Presence/Absence of Woodland period Plant Food Remains in the Blue Ridge and Ridge and Valley provinces.

	Blue Ridge Province		Ridge and Valley Province		
Taxon	**Smokemont†**	**Biltmore Mound‡**	**Icehouse Bottom§**	**Townsend****	**Birdwell††**
Crops					
Corn	**X***		**X**	**X**	**X***
Squash	**X**	**X**		**X**	**X**
Edible seeds					
Amaranth			**X**		
Bearsfoot			**X**	**X**	**X**
Chenopod	**X**	**X**	**X**	**X**	**X**
Cheno/Amaranth				**X**	
Composite	**X**				
Knotweed		**X**	**X**	**X**	
Maygrass		**X**	**X**	**X**	**X**
Little barley		**X**			
Ragweed					
Sumpweed	**X**	**X**	**X**		
Sunflower			**X**	**X**	
Native Fruits	**X**	**X**	**X**	**X**	**X**
Nuts					
Acorn	**X**	**X**	**X**	**X**	**X**
Hickory	**X**	**X**	**X**	**X**	**X**
Hazelnut	**X**	**X**	**X**	**X**	
Chestnut	**X**	**X**			**X**
Butternut					
Walnut	**X**	**X**	**X**	**X**	**X**

*These are comparable forms (cf.) of corn, and are not definitively identified.
† Hollenbach and Purcell 2013
‡ Kimball *et al.*2010
§ Chapman and Shea 1981
** Hollenbach and Yerka 2011
†† Johanson 2012

indeed present at Smokemont, then I would anticipate it showing up in the Middle Woodland flotation samples collected from the 2012 field season when they are analyzed.

There are a wide variety of edible seeds from the Icehouse Bottom site, including amaranth, chenopod, maygrass, knotweed, bearsfoot, sunflower, and sumpweed. Strangely, cucurbits are absent in the Middle Woodland component at Icehouse Bottom (Chapman and Shea 1981:72). The presence of these weedy seeds likely indicates that the people inhabiting Icehouse Bottom during the Middle Woodland period grew gardens, and remained at the site for at least part of the year. Fruits are also present in these samples, and include persimmon, maypop, cherry/plum, blackberry/raspberry, and grape. Hickory, black walnut, and hazelnut were found at both Icehouse Bottom and Smokemont. Acorn is present at Icehouse Bottom, yet largely absent at Smokemont, while chestnut is numerous at Smokemont and absent from Icehouse Bottom. It is possible that chestnut is absent from Icehouse Bottom due to a sampling error, confusion with acorn, or due to being processed in ways that would reduce the likelihood of carbonization (Chapman and Shea 1981:69).

At the Birdwell site (40Gn228) in Greene County, a circular Connestee pit (Feature 42A) contained significant amounts of carbonized plant remains, composed of a broad variety of plant taxa. Two tentatively identified corn cupules were recovered from this Connesstee pit. Hickory nuts, acorns, black walnuts, walnut family, chenopod, maygrass, and fruits are well-represented taxa in this pit (Johanson 2012:63). Some chestnut (n=28) was also recovered from the Connestee phase at 40Gn228, but not in the amounts found at Smokemont. Hickory was the most common nut taxa from the Birdwell site. This may be due to preservational differences and not necessarily a difference in the importance of the nuts used at the two sites. Blackberry/raspberry, elderberry, and grape are all present. Bearsfoot and cucurbit rind were also identified in this sample.

At the four Townsend sites, plant remains from 20 Middle Woodland features were analyzed. Two definitive corn cupules were identified in the Townsend samples, one from the Middle Woodland period and the other assigned to the general Woodland period (Hollenbach and Yerka 2011:379). Nuts were the most common plant remains, particularly acorn and hickory. Some possible chestnut shell (n=288) was identified, but these samples may be acorn shell instead (Hollenbach and Yerka 2011:370-376). Black walnut, hazelnut, and walnut family were all present at Townsend. Fruits included blackberry/raspberry, blueberry, grape, maypop, and persimmon. Chenopod and maygrass were well represented in these samples. Amaranth, bearsfoot, chenopod/amaranth, knotweed, and sunflower were also present. Miscellaneous taxa include bedstraw, cane, grass family, monocot stem, pine cone, pokeweed, and purslane.

Nuts were abundant at the Biltmore Mound site, particularly hickory with over 2000 nutshell fragments, and acorn with 878 fragments. Small amounts of black walnut (n=38), hazelnut (n=4), and chestnut (n=52) were also present. The majority of nutshell found came from the zones of the ditch, which was also filled with an abundance of faunal remains and exotic artifacts and appears to have served a ritualistic purpose (Kimball *et al.* 2010:46).

A pit dug into the ditch after it was filled (Feature 28) contained a lining of white sand, a dozen charred pine cone fragments, and portions of a bear maxilla that appears to have been ritually “killed” before being deposited (Kimball *et al.* 2010:46-47). It is interesting that pine cone was used both ritualistically at the Biltmore Mound, and in a domestic context at Smokemont.

Edible seeds, including chenopod, knotweed, maygrass, little barley, and sumpweed are more or less evenly present throughout all contexts at Biltmore. Sumpweed seeds at this site appear to be the larger, domesticated variety, making Biltmore the only Hopewellian site in the region with domesticated sumpweed (Kimball *et al.* 2010:52). Although two sumpweed seeds were present in Zone B of Feature 132 at Smokemont, they were not measured to determine if they showed morphological changes caused by domestication.

Corn moved into the region during the Middle Woodland period, and has been confirmed at both Icehouse Bottom and Townsend. A tentatively identified corn glume is present in one of the Connestee pits at Smokemont, but does not present enough evidence to confirm the presence of early corn at Smokemont. Two possible corn cupules were also identified at the Birdwell site, but again no solid evidence of corn was recovered.

Nuts were obviously an important food resource during the Middle Woodland period throughout the Appalachian Summit, and Smokemont was no exception. Acorns were the most abundant at the Greene County sites, hickories at Townsend, and chestnuts at Smokemont, although smaller amounts of other nutshells were present at all of the sites. This does not necessarily suggest that there was a preference for different types of nuts among these communities. These nut remains may represent cooking accidents, discard during food processing, or burning of storage pits in which the nuts have spoiled. Because hickory nuts, acorns, and chestnuts are processed and used differently, it seems logical that prehistoric peoples segregated the nuts after collection and during use. Nuts were likely processed and stored in batches, so since spills, discard, or spoilage caused nuts to become preserved archaeologically, it seems probable that if something went awry then many nuts from the same batch will be preserved. Therefore observations of regional nut use may reflect archaeological and depositional biases.

The large quantity of chestnuts at the Smokemont site may have been deliberate and unusual, or may indicate the significance of this food source throughout the region during the Middle Woodland period despite its poor preservation and inclusion in archaeobotanical samples. Chapman and Shea (1981) believe that the way chestnuts were processed may have contributed to their underrepresentation in archaeological context.

I conclude from these samples that people during the Connestee phase in the Appalachian Summit were using hickory, walnut, chestnut, hazelnut, and acorns. All of these nut taxa may not be abundant or represented in archaeobotanical samples from all Connestee sites, but this is likely due to the differences in preservation and processing of the nuts rather than an absence of their use.

Pisgah Phase

The Pisgah phase at Smokemont can be compared to the Warren Wilson and Garden Creek sites in the Blue Ridge province (Table 20). In the northern part of the Tennessee Valley, the Birdwell (40Gn228) and Neas (40Gn229) sites contained some Pisgah phase features. Further south in the Ridge and Valley province along the Little Tennessee River, the Martin Farm and Jones Ferry sites were occupied during the early Mississippian period Martin/Hiwassee

Island phase (A.D. 900- A.D. 1300)), and were contemporary with the Pisgah phase occupation at Smokemont.

Plant remains from the Warren Wilson site in North Carolina came from six pit features associated with Pisgah house floors. Plant remains from these pits contain mostly hickory nuts, along with walnut, butternut, and acorn. Corn, beans, squash, and sumpweed are all present. Grape, maypop, and persimmon, all midsummer to early fall fruits, have been identified in these samples. Yarnell identified some “weed seeds” in these samples from knotweed, bedstraw, nightshade, ragweed, chenopod, poke, and grass. Interestingly, no cane was found in these features (Yarnell 1976:217-219).

The plant samples collected from Garden Creek have not yet been analyzed; however, there is evidence of charred split-cane matting from the floor of a burned house in the village (Dickens 1976:90). Mats have been mentioned as floor coverings ethnohistorically (Williams 1930), and Garden Creek provides archaeological evidence of mats being used as floor coverings. Cane from the Pisgah phase features at Smokemont and the floor from the Birdwell site may have also come from mats used within the house.

At the Birdwell site (40Gn228) in Greene County, Tennessee, a possible Pisgah house floor (Feature 68) contained large amounts of acorn and cane. While large amounts of corn and squash are present at both Birdwell and Neas, bean is absent from both sites. The cane in this feature was interpreted as a source of fuel (Johanson 2012), although it may have also been from woven cane floor mats like the ones present in the Garden Creek house. Other taxa identified in

Table 20. Presence/Absence of Mississippian Period Plant Food Remains in the Blue Ridge and Ridge and Valley provinces.

	Blue Ridge province		Ridge and Valley province	
Taxon	**Smokemont†**	**Warren Wilson‡**	**Greene County§**	**Martin Farm and Jones Ferry ****
Crops				
Corn	X	X	X	X
Beans	X	X		X
Squash	X	X	X	X
Edible seeds				
Amaranth				
Bearsfoot	X			X
Chenopod	X	X		X
Cheno/Amaranth				
Composite	X			X
Knotweed	X	X	X	X
Maygrass	X			
Little barley				
Ragweed	X	X		X
Sumpweed		X	X	X
Sunflower	X		X	X
Native Fruits	X	X	X	X
Nuts				
Acorn	X	X	X	X
Hickory	X	X	X	X
Hazelnut	X			
Chestnut			X	
Butternut		X		
Walnut	X	X	X	X

† Hollenbach and Purcell 2013
‡ Yarnell 1976
§ Johanson 2012
** Chapman and Shea 1981

the Pisgah house floor include “black walnut, cucurbit rind, sunflower, knotweed, and pine cone, basin-shaped pit (Feature 119), contained corn, nearly 500 hickory nutshell fragments, and some chestnut. This feature was interpreted to suggest “significantly different use and/or discard patterns for this context” due to the wide variety of food taxa in this context (Johanson 2012:63).

The Martin Farm and Jones Ferry sites contain an abundance of archaeobotanical material. Corn, beans, and squash are all well represented, but edible seeds remained an important component of the diet. Nuts retained value in the local diet, but chestnut is absent. Chenopod is present, and there are a high number of composite family seeds, including sumpweed, sunflower, bearsfoot, and ragweed. Fruits are very abundant in the early Mississippian samples.

The plant remains from these sites are very similar. Nuts, particularly hickory, were common at all three sites. Although bearsfoot is found at Smokemont and is not present in the Greene County and Warren Wilson plant assemblages, seeds from sumpweed and sunflower, from the same family (Compositae) as bearsfoot, were likely used in a similar manner and are present at the other two sites. The absence of cane in the pits at the Warren Wilson site is interesting since cane is present at the Garden Creek, Birdwell, and Smokemont sites. At Birdwell, cane is present in large amounts in both the Pisgah floor and the pit feature. It is hard to say why cane is absent from the Warren Wilson samples. It could be that the pit features at Warren Wilson were used for a different purpose, or charred remains of cane fragments may have been lost due to preservation or the way the samples were collected.

Historic period (Overhill Cherokee and Qualla)

The Late Qualla phase at Smokemont can be compared to the Late Qualla occupations at Coweeta Creek and Ravensford in the Blue Ridge province (Table 21). Early, Middle, and Late Qualla occupations in the Blue Ridge province present at Coweeta Creek and Alarka may provide additional insight into the types of plants used in the region during the Qualla phase. Sites in the Ridge and Valley province containing contemporary Overhill occupations include Chota (40Mr2), Tomotley (40Mr5), Tanasee (40Mr62), Citico (40Mr7), and Wear Bend (Ld107). The Townsend sites have four or five houses that are from the same time period, and may be classified as either Overhill or Qualla phase occupations.

The Coweeta Creek site (31Ma34) contained several Late Qualla phase pit features that were likely filled with domestic trash. Only two of the pit features associated with the village yielded plant remains besides wood. Conversely, most of the pits associated with the townhouse yielded plant food remains in addition to wood, suggesting that a considerable amount of food processing occurred near the townhouse (VanDerwarker and Detwiler 2002:25).

Crops, fruits, nuts, and weedy seeds are present in the Coweeta Creek household refuse. Corn is the most abundant crop present at the site (VanDerwarker and Detwiler 2000:70). Beans, squash, chenopod, and little barley were also identified. No fruits were identified in the village pits at Coweeta Creek, but the townhouse samples contained grape, blackberry/raspberry, blueberry, maypop, persimmon, and peach (VanDerwarker and Detwiler 2002:24). Hickory, acorn, and walnut are all present in the household pits. Other seeds include bearsfoot,

Table 21. Presence/Absence of Historic Period Plant Food Remains in the Blue Ridge and Ridge and Valley provinces.

	Blue Ridge province				Ridge and Valley province	
Taxon	Smokemont†	Ravensford‡	Alarka§	Coweeta Creek**	Townsend††	Tellico Cherokee‡‡
Corn, beans, and squash	X	X		X	X	X
Edible seeds						
Amaranth		X				
Bearsfoot		X		X		X
Chenopod	X	X		X	X	X
Cheno/Amaranth		X				
Composite						X
Knotweed		X		X	X	X
Maygrass						X
Little barley				X	X	X
Ragweed	X	X				X
Sumpweed		X			X	X
Sunflower		X				X
European Foods						
Cow/field peas						X
Peach	X	X	X	X		X
Sweet potato cf.						X
Native Fruits	X	X	X	X	X	X
Nuts						
Acorn	X	X		X		X
Hickory	X	X		X	X	X
Hazelnut						
Chestnut						
Butternut						
Walnut	X	X	X	X	X	X

† Hollenbach and Purcell 2013
‡ VanDerwarker and Alvarado 2013
§ Shumate *et al*. 2005
** VanDerwarker and Detwiler 2000
†† Hollenbach *et al*. 2010
‡‡ Chapman and Shea 1981

chenopod/amaranth, wild chenopod, knotweed, pokeweed, and spurge (VanDerwarker and Detwiler 2000:74, 2002:24). VanDerwarker and Detwiler (2002) argue that Coweeta Creek is unusual in that it appears that most food processing at the site occurred around the townhouses, and comparatively little food processing happened in the village area. However, it is difficult to compare the food remains from the townhouse activities to those of the everyday domestic activities at Smokemont since they are likely the result of different types of activities.

Plant remains analyzed from a Middle Qualla phase household at the Alarka Farmstead site (31Sw273) produced few plant food remains. Five fragments of black walnut were recovered, although other nut remains were not. Three seeds from a storage/borrow pit south of the summer house include blackberry/raspberry and bedstraw. The most prevalent plant remains on the site were peach pit fragments. No field crops and very few other plant food remains are present in the Alarka Qualla house samples (Crites 2005:7.6).

At the Ravensford site, there appears to be a decrease in corn agriculture from the Early to Late Qualla phases. This may have resulted from disruption caused by white contact during the Late Qualla period. Increased disease and death rates may have led to population loss that would have disrupted group activities such as farming (Vanderwarker and Alvarado 2013:3).

Differences in the amount of corn from the Pisgah to Late Qualla phase at Smokemont do not likely reflect a similar pattern, and are interpreted as differential preservation of plant remains rather than obvious changes in subsistence practices. Corn kernels and other seeds in the Late Qualla hearth may be underrepresented because they were likely exposed to prolonged burning, vitrifying them and making them unidentifiable. Given the proximity of Smokemont to

Ravensford, it would not be surprising if they shared similar subsistence trends, but there is not a large enough sample spanning continuously from the adoption of corn agriculture during the Early Pisgah phase to the Late Qualla phase at Smokemont to confirm or disconfirm this theory. Particularly, no Early Qualla phase structures have been uncovered to date at Smokemont. The effects of European colonization certainly reached the people living at Smokemont, as indicated by the abundance of beads and other European trade goods present in the floor midden. However, it is likely that these trade items were acquired through indirect trade (Angst 2013**)** rather than direct contact, so the extent of European influence on the people in this region remains unclear. If additional archaeological excavations are conducted at Smokemont and Early Qualla occupation is found at the site, then perhaps Smokemont can be used to further test VanDerwarker and Alvarado's theory.

Fruits, nuts, and edible seeds from the Late Qualla samples at Ravensford are similar to those found at Smokemont. Although no chestnut shell was identified at Ravensford, large amounts of hickory and black walnut were present, along with some acorn and hazelnut. A large variety of fruits were identified, including blackberry/raspberry, elderberry, ground cherry, maypop, peach, persimmon, and sumac. Five hundred twenty-two chenopod seeds were in the Late Qualla samples, along with other grain and oil seeds, including amaranth and sunflower. Pokeweed, purslane, ragweed, and seeds from the mallow family were also present (VanDerwarker and Alvarado 2013:11-12).

A spatial analysis of a Late Qualla house at Ravensford was conducted (Structure 35) to determine what activities were occurring in different areas of the house, such as food storage and food preparation areas. Structure 35 appears to have been burned shortly after abandonment and all vessels and site furniture were removed from the structure (VanDerwarker and Alvarado 2013:40). Structure 1 at Smokemont does not appear to have been burned in a similar fashion, and the floor appears to have eroded due to post-depositional forces, therefore the same type of spatial analysis is not possible and may provide misleading results.

The Overhill Cherokee sites at Tellico contain corn, beans, and squash, as well as many edible seeds and fruits. Nuts continue to be used during the Historic period, but chestnut is still absent and there are fewer acorn shell fragments. The decreased use of acorn may have been due to the increased importance of maize at this time (Chapman and Shea 1981:69). Knotweed, chenopod, maygrass, sunflower, sumpweed, ragweed, and bearsfoot all remain important components of the diet. Native fruits, including hawthorn, honey locust, maypop, cherry/plum, blackberry/raspberry, and grape continue to be collected. European-introduced foods are abundant in the Tellico Overhill Cherokee samples, and include peach, cowpeas, field peas, and possibly sweet potatoes. Peach was the only European plant found in the Late Qualla house at Smokemont.

Plant samples were analyzed from the 24 Cherokee features that were associated with six identified houses at the Townsend sites (Hollenbach *et al.* 2010:305). Features were small to large pits and basins, as well as two hearths (Hollenbach *et al.* 2010:308). Corn, beans, and squash were all well-represented at Townsend, and some edible seeds were present in the samples, including chenopod, little barley, knotweed, and sumpweed (Hollenbach *et al.* 2010:311). There were many nuts in the Townsend samples, mostly hickory, black walnut, and walnut family. Some acorn was also present, and no chestnut was identified. There were two walnut family/peach fragments, but no definitive evidence of peach came from Townsend. Native fruits included blackberry/raspberry, blueberry, grape, hackberry, maypop, persimmon, and plum/cherry. A surprisingly large amount of pine cone (n=3000) was found in the Townsend samples (Hollenbach *et al*. 2010:311-312). Pine cones and seeds held no dietary value to humans in the Southeast. However, the large amount of pine cones present at Townsend suggests that they were gathered and burned as a source of fuel.

Corn, beans, and squash continued to be dietary staples throughout the Appalachian Summit. Although there appears to be a decrease in crops and an increase in edible seeds, nuts, and fruits at Ravensford, the samples from Smokemont do not appear to indicate a similar trend. Edible seeds, fruits, and nuts continued to remain important at Coweeta Creek, Townsend, Tellico, and Smokemont. Chestnut is not as well represented in the Late Qualla phase samples from Smokemont (n=2), and does not appear in the other Historic period sites. The Alarka site contained a narrow range of plant foods that contained some nuts and native fruits, but no crops or edible seeds. Peaches were abundant at Alarka, and were common at all sites across the Appalachian Summit except for Townsend. In addition to peach, the Overhill Cherokee sites at Tellico also contained cowpeas, field peas, and possible sweet potatoes. Besides peach, no other European foods were present at Coweeta Creek, Alarka, Ravensford, Townsend, or Smokemont. Peach was also common at the Late Qualla occupations of Coweeta Creek and Ravesford, as well as the Middle Qualla house at Alarka, but no other European foods were present. At the Townsend sites, there is no conclusive evidence for peach or other European foods.

Discussion

Native Americans living at Smokemont collected, gardened, and farmed similar types of plant foods used at other sites in the Appalachian Summit. Many plants had multiple uses, and could be dried and stored for use during the winter. Introduced New World plants that moved into the region were not always adopted immediately. As corn became the predominant plant food resource, the use of other indigenous plants changed, although traditional food resources were not completely abandoned. Corn was an important component in Native American religion, and was linked directly to women. After the adoption of corn agriculture, nuts continued to be an important component of the diet. The use of edible seeds decreased with the intensification of corn agriculture, but they were still used for foods and medicines. Peaches were introduced by Europeans, and spread throughout the Southeast, where they were quickly adopted during the Historic period, although the absence of peach at the Townsend sites is particularly interesting. At the Tellico Cherokee sites, cowpeas, field peas, and possibly sweet potatoes were also introduced. Peaches and other European foods likely traveled through native trade networks before extensive direct European contact (Gremillion 1993).

The increased presence of weed seeds from the Pisgah to the Late Qualla phases at Smokemont may signal an intensification of agriculture as more land was cleared for planting fields, which in turn create larger disturbed habitats ideal for the growth of these plants (Hollenbach and Purcell 2013:116). Weedy plants serve as disturbance indicators, and many were cultivated and domesticated as well (Logan and Dixon 2000:31). The growth of weedy plants such as purslane, pokeweed, and bedstraw may have even been actively encouraged since they were important sources of leafy greens, dyes, and medicines. While modern Euro-Americans often distinguish between plants that are ritualistic, economic, symbolic, or mundane, these meanings and uses of plants among Native Americans were probably more interwoven. Corn for example was not only a dietary staple, but was also spiritually linked to the corn mother Selu, and this relationship was key to Native American social structure and celebrated each year at the Green Corn Ceremony (Perdue 1999).

Conclusions

Although there are limitations when interpreting paleoethnobotanical remains, the resulting data can provide insight into the daily lives of Native Americans that cannot be interpreted from other archaeological materials. By looking for patterns in the plant remains from Smokemont, and by incorporating ethnobotanical data, the foodways of Native Americans in the Appalachian Summit from the Connestee phase through the Historic period can be better understood. In addition to foodways, medicinal and utilitarian uses for plants can be extrapolated from these data. The results of this thesis demonstrate that the types of plant resources people living at Smokemont were using were relatively consistent through time and across the region, but the ways plants were used changed through time. People lived at Smokemont over extended periods of time. It is a flat place in the mountains with an abundance of natural resources. Even after people came to depend on the cultivation of corn, beans, and squash as their primary plant foods, gathered nuts, foods, and edible seeds were still incorporated into the diet. Plants were used daily to make houses, fires, medicines, and utilitarian items such as baskets and mats. These items do not preserve archaeologically in the same ways that pottery and stone tools do, so we must turn to the archaeobotanical remains for evidence of their presence.

Relevance of this Research

The plant remains from Smokemont provide evidence for the way plants were used on a daily and seasonal basis within domestic contexts. Archaeological materials from Smokemont suggest that, although Native Americans occupied the site from the Archaic period through the Historic period, it was never a densely populated site. The archaeology from smaller settlements like Smokemont is not as well studied as larger settlements, partly because of the greater archaeological visibility of towns (Purrington 1983; Rodning 2004:33). Smaller settlements and farmsteads can provide a “fine-grained” analysis of artifact assemblages that can be useful when differentiating between a dense assemblage of artifacts found in a heavily occupied town site and the relative composition of a single unit of occupation (Shumate *et al.* 2005:1.5).

Despite differences in the ceramic styles and cultural practices of Native Americans in the Appalachian Summit, the types of foods being used were similar for small settlements, towns and villages, and ceremonial centers across the region. In the Connestee phase, edible seeds were grown and eaten regularly, and fruits supplemented the diet. Nuts were extremely important during the Connestee phase, and are well represented at all of the sites included in this research. Although acorn is not significant in the pits from Smokemont, it is commonly found in other Connestee contexts. Chestnut shows up at the Biltmore Mound and Birdwell sites, but is not nearly as numerous as it is at Smokemont. The amount of chestnut present at Smokemont seems to indicate that, although it does not appear as frequently or in the same amounts as denser nutshell like hickory and walnut, chestnuts were an important food source prehistorically. The decimation of American chestnut trees in the twentieth century due to the chestnut blight resulted in the economic loss of chestnut as both a wood and food source.

Corn entered the region during the Middle Woodland period, but was likely not an important crop until the Mississippian period. The presence of corn in Middle Woodland contexts has been confirmed at Icehouse Bottom and Townsend, and tentatively identified at Birdwell and Smokemont. Woodland period samples from the 2012 Smokemont field season may reveal additional evidence of corn that is more definitive than the possible glume from Feature 132.

During the Mississippian and Historic periods, corn, beans, and squash were common throughout the Appalachian Summit. Despite the growing importance of crops, native edible seeds, fruits, and nuts remained important components of the diet. In the Historic period, European foods were introduced, including peach, cowpeas, field peas, and sweet potatoes. These plants likely initially traveled to many of the sites in the Appalachian Summit through “down the line” trade rather than direct European contact. The European plants most readily adopted by Native Americans required little tending and grew in ways similar to native plants (Gremillion 1993). Although peach was present on almost all of the Historic period sites considered in this research, cowpeas, field peas, and sweet potatoes were present only in the Little Tennessee River Valley. The Townsend sites, surprisingly, contained no definitive evidence of European plant foods.

The archaeobotanical samples from Smokemont provide useful evidence of the plants used at this site, and they enhance our understanding of the way plants were used in the Appalachian Summit. The raw data from Smokemont adds to a growing body of paleoethnobotanical research in the Southern Appalachian Mountains, and contributes to research on the protohistoric Cherokees. This research gives us a glimpse into the activities of women, children, and the elderly. Because they were the “owners” of crops and fields, women are particularly visible in the archaeological record through the analysis of plant remains, providing insight into the activities of a segment of society that may otherwise be overlooked.

Given their roles in land ownership, kinship, and religion, the daily activities of women are essential to understanding Native American cultures (Perdue 1999).

Today, many native plant foods eaten prehistorically are widely thought of as nuisance weeds with no economic significance despite clear archaeological evidence that they once held great dietary value. Some researchers suggest that certain traditional plant foods, such as sumpweed, are highly nutritious and may be beneficial in a world constantly in need of more and better food sources (Heiser 1985:172). A revitalization of traditional plant use among Native American populations may also provide significant health benefits. Modern Native American communities suffer from an epidemic of diabetes, obesity, heart disease, and hypertension caused by genetic susceptibility and a high level of fats and carbohydrates in the diet (Nabhan 2004:167-168). In addition to their potential health benefits, traditional foods can serve as a source of cultural pride (Nahban 2004). Research on plant foods eaten in the past provides invaluable historical data to descendant communities today. And Smokemont is clearly an instructive case in point.

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Appendix

Appendix A.Raw Counts and Weights of 31SW393 2010 Archaeobotanical Samples.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
07-105	Str. 1 TU 7	3.54	2.02			
				Acorn	6	0.01
				Bark	2	0.01
				Bean	1	0.01
				Bean cf.	1	0.00
				Bedstraw cf.	2	0.00
				Black walnut	1	0.01
				Black walnut/peach	12	0.06
				Chenopod	3	0.00
				Composite family cf.	4	0.00
				Corn cupule	12	0.07
				Corn glume	1	0.00
				Corn kernel	5	0.03
				Cucurbit rind	3	0.01
				Grass family	1	0.00
				Hickory	3	0.01
				Monocot stem	4	0.04
				Peach	1	0.01
				Persimmon seed cf.	1	0.00
				Persimmon seed coat	1	0.00
				Pine cone	1	0.00
				Pitch	103	0.55
				Plum/cherry cf.	1	0.00
				Seed a	5	0.00
				Seed b	3	0.00
				Seed c	3	0.00
				Seed d	47	0.01
				Thin hickory	2	0.01
				Unidentifiable	6	0.01
				Unidentifiable seed	34	0.02
				Unidentified seed, 5-lobed	2	0.00
				Unidentified seed	1	0.01
				Wood, part carbonized	0	0.64

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
07-106	Str. 1 TU 10	2.82	2.20			
				Acorn	1	0.00
				Bean cf.	1	0.00
				Bedstraw	1	0.00
				Black walnut	2	0.01
				Black walnut/peach	1	0.01
				Cane	1	0.00
				Chestnut cf.	2	0.00
				Corn cupule	2	0.00
				Corn kernel	1	0.00
				Cucurbit rind	1	0.00
				Hickory	1	0.01
				Peach	1	0.00
				Persimmon cf.	1	0.00
				Pitch	106	0.52
				Plum/cherry cf.	1	0.00
				St. Johnswort cf	1	0.00
				Unidentifiable seed	4	0.00
				Unidentified seed	3	0.01
				Unidentified seed b	1	0.00
				wood, part carbonized	0	0.06
07-117	Str. 1 TU 7	2.90	2.13			
				Acorn	7	0.02
				Bark	6	0.02
				Black walnut	1	0.06
				Black walnut/peach	8	0.08
				Corn cupule	5	0.02
				Corn glume	1	0.00
				Corn kernel cf.	1	0.00
				Cucurbit rind	2	0.02
				Gall	3	0.00
				Hickory	4	0.04
				Maypop	1	0.00
				Peach	2	0.03
				Persimmon fruit cf.	2	0.01

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Persimmon seed	1	0.00
				Pine cone	1	0.00
				Pitch	95	0.38
				Plum/cherry cf.	1	0.00
				Unidentifiable	7	0.04
				Unidentifiable seed	3	0.00
				Unidentified seed	3	0.00
				Walnut family	2	0.02
				Wood, part carbonized	1	0.03
07-130	Str. 1 TU 5	3.63	2.92			
				Aster family cf.	1	0.00
				Bark	1	0.01
				Bean cf.	2	0.01
				Bean/persimmon cf.	1	0.00
				Bedstraw cf.	1	0.00
				Black walnut	3	0.02
				Hickory	1	0.00
				Pitch	112	0.53
				Triangular seed	1	0.00
				Unidentifiable	3	0.01
				Walnut family	1	0.01
				Wood, part carbonized	0	0.12
07-137	Str. 1 TU 11	1.97	1.37			
				Acorn	2	0.00
				Bedstraw	2	0.00
				Bedstraw cf.	5	0.00
				Black walnut	7	0.06
				Bud	1	0.00
				Corn cupule	2	0.01
				Corn cupule cf.	1	0.00
				Corn glume	1	0.00
				Corn kernel	3	0.01
				Cucurbit rind	1	0.01
				Gall	1	0.00
				Hickory	1	0.01

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Oily seed	4	0.00
				Pitch	55	0.41
				Plum/cherry cf.	1	0.00
				Ragweed	3	0.00
				Ragweed cf.	1	0.00
				Tiny seed	38	0.00
				Unidentifiable	4	0.01
				Unidentifiable seed	2	0.00
				Unidentified seed coat	8	0.01
				Walnut family	2	0.01
				Wood, part carbonized	0	0.06
07-142	Str. 1 TU 7	3.56	2.36			
				Acorn	9	0.01
				Bark	5	0.02
				Corn cupule	2	0.01
				Corn cupule cf.	1	0.00
				Corn kernel	3	0.01
				Corn kernel cf.	2	0.01
				Cucurbit rind	1	0.00
				Gall	1	0.01
				Hickory	4	0.05
				Monocot stem	1	0.00
				Pitch	161	0.95
				Stem	1	0.01
				Unidentifiable	7	0.02
				Unidentifiable seed	1	0.00
				Wood, part carbonized	0	0.10
07-195	F. 93 W 1/2	2.23	0.93			
				Acorn meat cf.	6	0.02
				Bark	60	0.52
				Bearsfoot	1	0.00
				Blackberry/raspberry	3	0.00
				Cane	3	0.00
				Chenopod	2	0.00
				Corn cupule	3	0.00
				Corn cupule cf.	2	0.00

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Corn glume	1	0.00
				Corn kernel	19	0.06
				Hazelnut	2	0.00
				Hickory	8	0.04
				Persimmon cf.	1	0.00
				Pine cone	2	0.00
				Pitch	29	0.14
				Sedge family cf.	1	0.00
				Stem	2	0.00
				Sunflower cf.	1	0.00
				Unidentifiable	10	0.00
				Unidentifiable seed	2	0.00
				Unidentifiable seed fragments	8	0.00
				Unidentified nutshell	3	0.00
				Walnut family	3	0.00
				Wood, part carbonized	0	0.00
07-196	F. 93 W 1/2 Zone B	0.27	0.11			
				Acorn	1	0.00
				Bark	13	0.06
				Black walnut cf.	1	0.00
				Cane	1	0.00
				Corn kernel cf.	1	0.00
				Hickory	4	0.00
				Nutshell	3	0.00
				Unidentifiable	4	0.00
				Wood, part carbonized	0	0.00
07-199	Str.1 Hearth	8.26	7.22			
				Acorn	1	0.00
				Acorn meat	2	0.00
				Bark	4	0.00
				Black walnut	1	0.05
				Corn cupule	2	0.00
				Corn glume	1	0.00
				Corn kernel	2	0.00
				Corn kernel cf.	2	0.00
				Hawthorn cf.	1	0.00

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Hickory	3	0.00
				Holly cf.	1	0.00
				Nutshell	1	0.00
				Nutshell cf.	3	0.00
				Peach cf.	1	0.00
				Peach/black walnut cf.	11	0.04
				Pine cone	1	0.00
				Pitch	211	1.04
				Purslane	5	0.00
				Seed coat cf.	1	0.00
				Stem	1	0.00
				Squash rind	1	0.00
				Unidentifiable	3	0.01
				Unidentifiable seed coat	2	0.00
				Wood, partially carbonized	0	0.57
07-200	Str.1 Hearth	5.00	3.50			
				Acorn	1	0.00
				Acorn/chestnut	8	0.00
				Bark	67	0.94
				Black walnut/peach	10	0.04
				Chenopod	2	0.00
				Corn cupule	5	0.01
				Corn cupule cf.	7	0.00
				Corn kernel cf.	1	0.00
				Cucurbit rind	1	0.00
				Grass family	1	0.00
				Hickory	6	0.03
				Hickory cf.	3	0.00
				Hickory, thin	7	0.00
				Insect body	1	0.00
				Peach pit	4	0.06
				Peach/walnut	1	0.00
				Pine cone	2	0.00
				Pitch	182	0.50
				Ragweed	1	0.00
				Tulip tree	1	0.00

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Unidentifiable	27	0.05
				Unidentified nutshell/seed	1	0.00
				Unidentified seed	3	0.00
				Walnut family	36	0.07
				Wood, partially carbonized	0	0.03
07-209	Str. 1 Hearth	6.31	5.07			
				Acorn meat cf.	2	0.00
				Bark	19	0.02
				Bud	1	0.00
				Chestnut/acorn cf.	2	0.00
				Corn cupule	1	0.00
				Corn kernel cf.	2	0.00
				Fagus family	1	0.00
				Hickory	8	0.00
				Hickory, partially carbonized	8	0.00
				Insect gall	3	0.00
				Juglandaceae	12	0.00
				Peach/black walnut	7	0.10
				Persimmon seed coat	1	0.00
				Pine cone	1	0.00
				Pitch	167	1.12
				Purslane	1	1.00
				Ragweed	2	0.00
				Squash rind	2	0.00
				Unidentifiable	39	0.00
				Unidentified seed	1	0.00
				Wood, partially carbonized	0	0.14
07-327	F. 151	40.80	36.34			
				Acorn	11	0.03
				Acorn cf.	3	0.00
				Acorn cap	1	0.00
				Acorn cap cf.	2	0.00
				Aster family cf.	1	0.00
				Aster seed head	2	0.00

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Bark/stem	23	0.06
				Bearsfoot	28	0.00
				Bedstraw cf.	1	0.00
				Black walnut	10	0.06
				Bud	2	0.01
				Cane	128	0.93
				Cane cf.	5	0.00
				Chenopod	5	0.00
				Chestnut	1	0.00
				Corn cupule	8	0.05
				Corn cupule cf.	8	0.02
				Corn kernel cf.	1	0.00
				Cucurbit rind cf.	1	0.00
				Five-lobbed seed	6	0.00
				Five-lobbed seed top	1	0.00
				Gall	8	0.00
				Grape	5	0.00
				Grape cf.	2	0.00
				Grass family cf.	2	0.00
				Hazelnut	1	0.00
				Hickory	112	2.09
				Hazelnut	1	0.00
				Hickory cf.	13	0.03
				Knotweed	1	0.00
				Maypop	1	0.00
				Node	11	0.02
				Peduncle/stem	1	0.00
				Persimmon seed coat	1	0.00
				Persimmon seed coat cf.	1	0.00
				Persimmon seed cf.	1	0.00
				Pine cone	7	0.02
				Pine cone/bark	93	0.32
				Pine needle base	1	0.00
				Pitch	44	0.31
				Pokeweed	184	0.06

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				raspberry/blackberry	18	0.00
				Spore clump	1	0.00
				Stem	38	0.21
				Thorn	1	0.00
				Tulip tree cf.	1	0.00
				Unidentifiable	29	0.11
				Unidentifiable seed	13	0.00
				Unidentified (circular)	3	0.00
				Unidentified thick seed	7	0.01
				Walnut family	9	0.12
				Wood/cane, part carbonized	12	0.06
07-339	F. 132	5.79	5.79			
07-340	F. 132	9.65				
				Cane	17	0.36
				Chestnut meat	48	6.07
				Chestnut shell	2	0.01
07-344	F. 157	16.44	15.25			
				Acorn	25	0.02
				Acorn cf.	2	0.00
				Aster family cf.	5	0.00
				Bearsfoot	5	0.00
				Bedstraw	6	0.01
				Black walnut	12	0.09
				Blackberry/raspberry	21	0.01
				Blackberry/raspberry cf.	1	0.00
				Bud	7	0.00
				Cane	11	0.05
				Cane cf.	2	0.00
				Catkin/stem	11	0.10
				Chenopod	1	0.00
				Chenopod perisperm	83	0.03
				Corn cupule	3	0.00
				Gall	4	0.00
				Grass family	5	0.00
				Gall	4	0.00

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Hazelnut	2	0.01
				Hickory	43	0.72
				Legume cf.	2	0.00
				Maygrass	1	0.00
				Maygrass cf.	1	0.00
				Peduncle/stem	6	0.01
				Persimmon seed cf.	2	0.00
				Pine cone	20	0.06
				Pitch	11	0.02
				Pokeweed	7	0.00
				Pokeweed cf.	13	0.01
				Ragweed cf.	3	0.00
				Tobacco	1	0.00
				Unidentifiable	9	0.03
				Unidentifiable seed	74	0.03
				Unidentified seed a	1	0.00
				Unidentified seed b	1	0.00
				Unidentified seed c	12	0.00
				Wood, part carbonized	4	0.01
07-346	F. 122	99.26	59.97			
				Acorn cap cf.	1	0.01
				Acorn cf.	3	0.01
				Acorn meat cf.	2	0.11
				Bark	10	0.07
				Black walnut	89	2.50
				Cane	31	0.11
				Cane cf.	1	0.00
				Chenopod	2	0.00
				Chestnut meat	180	2.78
				Chestnut meat cf.	107	1.31
				Chestnut shell	70	0.25
				Chestnut shell cf.	15	0.04
				Cucurbit rind	21	0.13
				Hazelnut	4	0.02
				Hickory	18	0.26
				Hickory husk cf.	1	0.02

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Legume cf.	1	0.00
				Node/stem	22	0.18
				Nutmeat cf.	194	0.93
				Nutshell	13	0.09
				Persimmon seed cf.	1	0.00
				Pine cone	19	0.08
				Pitch	0	29.61
				Sumpweed	2	0.00
				Unidentifiable	55	0.22
				Unidentified - fruit seed?	1	0.01
				Unidentified starchy seed	3	0.00
				Walnut family	52	0.49
				Wood, part carbonized	14	0.06
				Walnut family	52	0.49
07-352	F. 132	6.53	5.25			
				Black walnut	1	0.28
				Chestnut meat	10	0.95
				Chestnut meat cf.	2	0.05
07-358	F. 132	7.25	5.53			
				Black walnut	1	0.20
				Chestnut meat	9	1.52
07-359	F. 132	34.03	16.54			
				Acorn	1	0.00
				Black walnut	208	4.17
				Cane	44	0.23
				Chestnut meat	302	5.05
				Chestnut meat cf.	278	1.85
				Chestnut shell	725	2.25
				Corn glume cf.	1	0.00
				Hazelnut	9	0.04
				Hickory	113	1.72
				Honey locust	1	0.00
				Node	1	0.01
				Nutmeat, unidentified	7	0.02

Appendix A. Continued.

BCL	Context	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Pine cone	31	0.07
				Pitch	183	0.99
				Stem	3	0.02
				Unidentifiable	61	0.18
				Unidentified fruit seed	1	0.02
				Unidentified nutshell	22	0.22
				Walnut family	94	0.65
07-362	F. 122	41.54	41.20			
				Chestnut meat cf.	1	0.01
				Node cf.	1	0.00
				Pitch	36	0.33
				Unidentified seed	1	0.00
				Wood	0	41.20
07-366	F. 122	3.01	2.69			
				Chestnut meat	2	0.26
				Pitch	1	0.06
07-370	F. 122	36.13	34.91			
				Bark	45	0.25
				Black walnut	5	0.13
				Cane	52	0.36
				Chestnut meat, part carbonized	1	0.01
				Chestnut meat	12	0.07
				Chestnut shell	1	0.01
				Hickory	1	0.04
				Nutmeat cf.	12	0.03
				Nutshell, unidentified	1	0.00
				Pine cone	5	0.01
				Pitch	33	0.25
				Unidentifiable	8	0.03
				Unidentified seed coat/nutshell	1	0.00
				Wood, part carbonized	6	0.03

Appendix B. Raw Counts and Weights of Structure 3 Qualla Phase Postmolds (Carmody and Hollenbach 2008).

BCL	Feature	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
07-72	37	1.21	0.96			
				Acorn cap cf.	2	0.00
				Acorn meat cf.	1	0.00
				Bark	2	0.03
				Bedstraw	1	0.00
				Black walnut	1	0.04
				Corn cupule	2	0.01
				Corn cupule cf.	3	0.01
				Corn kernel	2	0.00
				Hickory	5	0.05
				Maygrass	1	0.00
				Persimmon seed coat cf.	1	0.00
				Pitch	27	0.09
				Squash rind	3	0.01
				Thin hickory	1	0.00
				Unidentifiable	5	0.01
				Unidentifiable seed	2	0.00
07-83	38	3.61	2.96			
				Acorn	5	0.01
				Acorn cf.	2	0.00
				Bark	2	0.01
				Bark/pine cone	2	0.00
				Black walnut	1	0.06
				Black walnut cf.	1	0.00
				Bud	1	0.00
				Corn cupule	1	0.01
				Corn cupule cf.	4	0.02
				Corn kernel cf.	2	0.01
				Knotweed	1	0.00
				Monocot stem	1	0.03
				Peach	1	0.11
				Pitch	54	0.24

Appendix B. Continued

BCL	Feature	Plant Weight (g)	Wood Weight (g)	Common Name	Count	Weight (g)
				Squash rind	2	0.01
				Unidentifiable	8	0.02
				Unidentifiable seed	2	0.00
				Walnut family	6	0.07
				Wood, partially carbonized	2	0.05
07-82	39	4.92	3.48			
				Acorn	7	0.01
				Acorn cf.	9	0.01
				Bark	5	0.03
				Bean	1	0.03
				Bean cf.	1	0.01
				Black walnut	6	0.05
				Blackberry/raspberry	1	0.00
				Bud	1	0.01
				Cane	2	0.00
				Corn cupule	3	0.01
				Corn cupule cf.	11	0.04
				Corn glume	3	0.01
				Corn kernel	2	0.00
				Corn kernel cf.	3	0.00
				Hickory	9	0.09
				Hickory cf.	2	0.00
				Pitch	88	0.97
				Squash rind	3	0.01
				Unidentifiable	17	0.08
				Unidentifiable seed	2	0.00
				Walnut family	7	0.08
07-86	40	0.37	0.2			
				Bedstraw cf.	1	0.00
				Corn cupule	1	0.01
				Hickory	4	0.04
				Maypop, uncarbonized	7	0.06
				Pine cone	1	0.00
				Pitch	9	0.04
				Unidentifiable	2	0.02
				Walnut family	1	0.00

Vita

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